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FROM

Department of Lands
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THE OTTAWA REGION.

Description of surveyed townships, exploration of territories
and scaling of rivers

From 1889 to 1908.

Quebec (Province)
Published by the Department of Lands and Forests
1908.

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Book of the ...
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BOUND NOV 16 1914

The Ottawa Region

This volume contains the description of all the surveyed townships in the region watered by the Ottawa river or its tributaries, together with the reports on the exploration of the unorganized territories and rivers from 1889 to the year 1908 inclusively.

It further contains the reports on recent explorations in the Abitibi district, in the James' Bay region and in the basin of Hudson's Bay.

An index at the end of the volume will enable the reader to readily find the subjects in which he is more particularly interested.

Description of the surveyed townships

COUNTY OF BERTHIER

Township of Courcelles

I subdivided two ranges of 19 lots each, fronting on the Mastigouche river, and a range, also of 19 lots, fronting on the north-east branch of Lac des Iles, the whole as shown on the plan accompanying this report. This new subdivision represents the portion of Courcelles most favourable for settlement and in fact it is well suited for farming. The soil is a yellow loam, rocky but very fertile. Clayey soil on the surface is found only near Lac à la Vase.

Moreover, this part of Courcelles is not hilly and broken like most of the land in this section of the Laurentides.

The Mastigouche river has several water-powers which might be used to advantage for lumbering in the splendid surrounding forests. Timber of various kinds is very abundant such as white and black birch, spruce, fir, cedar, maple and pine. The tracing of the Desautels road is a complete success, if we consider the hilly country met with when passing over the Brassard road. I may really say, that I saw no bad places on the whole line through the township of Courcelles and in the portion of Provost through which this road runs. The soil is arable everywhere and well adapted for farming operations. The climate as far as I could ascertain, seemed to be similar to that of the Saguenay region.

ELZ. BOIVIN, P. L. S. (1891).

Townships of Courcelles, Provost and Brassard

Notwithstanding their remoteness from the large centres, the parishes of Saint Michel des Saints and Saint Zenon offer indisputable advantages for colonization owing to the fertility of their soil, of which I was enabled to form an idea through the fine standing crops I saw when I passed there and also the slight labour required for clearing the ground. In many places the trees had been completely destroyed by forest fires.

In the township of Provost the land is generally undulating, the soil rich with little or no stones. Splendid plateaux are found there.

The soil of the township of Brassard is likewise fertile but lighter, more level and free from stones.

Between the townships of Joliette and Provost, the Brassard road, crossing a portion of the townships of Tracy and Courcelles, runs for a distance of about twelve miles between high and rocky hills among which, however, are valleys containing arable land.

The position of those lands on a main road has, probably more than the fertility of the soil, induced many settlers to establish themselves there. Thus, in Tracy, there are eight farms some of which have been fifteen and eighteen years in existence. The cultivated areas along the road and extending on both sides of the Rivière Noire, are as much as fifty and even seventy-five acres in extent.

The few residents have built good houses and barns. In Courcelles there are also good farms that are fairly old and others only just begun.

J. A. MARTIN, P. L. S. (1896).

Township of Provost

This township which lies right on the northern slope of the Laurentians, is very hilly as a rule; the ravines are deep and inequalities of the soil of all kinds are very frequent.

The most hilly part is on the south-west of the township in ranges A, B, C, D, E, F, G and H. In the remainder of the township, that is to say in ranges J, K, L, M, and XIV to XVIII, the land is fairly level and, as a rule, very fit for settlement.

The soil is fertile everywhere, but very stony. It consists of yellow loam on a clayey sub-soil.

The forest is very fine on these mountains, and more especially in the township of Provost. The merchantable timber consists of spruce, black birch, cedar and pine. There is also some maple and some balsam fir.

ELZ. BOIVIN, P. L. S. (1891).

Township of Tracy

I traced the north-western outer line of this township. In the first three miles the line runs through a hilly country but very suitable for cultivation. The soil is yellow loam with very few stones. There is hardly any merchantable timber. Along the last four miles, the land is very hilly, rocky and but little fit for cultivation. This portion is fairly well timbered with merchantable spruce.

J. D. A. FITZPATRICK. P. L. S. (1897).

Township of Gauthier

Topography.—The land rises most rapidly in the rear part of the township of Brandon.

The point where the Brandon and Gauthier outline crosses the Saint Damien road is seven hundred and fifty feet above the church.

The township of Gauthier is a rough, broken, rocky tract, interspersed with some beautiful lakes in which there do not appear to be any fish. The greater part of the land is too rocky to admit of cultivation.

Timber.—There is a fair quantity of spruce, fir, birch, maple, etc., with some good cedar on the low lands.

The mean elevation of this township is from twelve to fifteen hundred feet above the sea level.

H. O'SULLIVAN, I. S. (1884).

Township of Gouin

The work consisted in dividing a range on either side of the Matawin river from the main south-west line of the township of Brassard and Provost to the western side line of lot No. 46 which determines the south-western boundary of the township of Gouin.

I began by scaling the Mattawin river and, after ascertaining that its course does not lie far from the point indicated on the plan sent me by your Department with my instructions, in order to fix the front of each lot on that river, I planted thick posts, well squared and well marked, solidly fixed in the ground, giving each lot a width of thirteen chains at right angles with the exception of lot No. 1 in the 4th and 5th ranges.

I put up stone boundaries with pieces of broken glass underneath to serve as evidence with a squared cedar post in front at all the points indicated on the plan accompanying instructions.

I traced all the lines on astronomical courses, verified by frequent observations of the North Star at its elongation and ascertained, each time, the declination of the needle.

All the lines I traced have been well opened up, well blazed and well cleared; the outer lines and the directing lines are at least three feet wide and the range lines at least two feet.

To the right of the post for each lot I traced a line about a chain and a half to serve as a starting point in tracing the side lines of the lots.

Timber.—As most of the territory I surveyed has been burnt over, very little merchantable timber remains. The burnt territory extends from lot No 18 on each side of the river to lot No 46 inclusively, on a depth varying from half a mile to a mile and a half and more.

From the dividing line between the counties of Joliette and Berthier that is from lot No 1 to lot No 18 the two banks of the river are well wooded with spruce, birch, cedar and poplar.

The owners of the limits covering this portion of the township of Gouin are at work cutting off the timber and I think that when the present lumbering operations are over the little that will remain will barely suffice for the settlers' needs.

Soil.—The soil is excellent where the land is level and the top consists of rich sandy soil on a bed of yellow sand.

The land of the Mattawin river in the parish of St. Michel des Saints which adjoins it, seems to be of the same kind and is very fertile.

The broken ground is rocky, especially near the portages around falls and rapids.

I deem it my duty in this report to call the attention of the Government to the fact that the Laurentides Pulp Company which owns the limits has had a road opened from the township of Brassard to Cypres lake.

The road is practicable for wheeled vehicles as far as the spot where it crosses the Mattawin river. In my opinion, after passing over that road several times, your Government could, at a small expense, make a good road of it which would be useful in settling the lots I have just surveyed.

On the Mattawin river, opposite lot No. 27, there is a splendid water-power. Although I made no calculations I am inclined to think that about fifteen hundred horse-power could be developed.

There is also a small water-power on lots Nos. 19 and 20, the force of which was calculated by Mr. E. H. N. Piton, surveyor, who made a report on it to your Department.

J. P. B. CASGRAIN, P. L. S. (1906).

COUNTY OF JOLIETTE

Township of Cathcart

I subdivided a part of the tenth and eleventh ranges of the township of Cathcart, county of Joliette, starting from lot No 10 to the north-eastern line of the township of Chertsey.

The land traversed by these two lines is very mountainous and, in general, little suited to settlement. There is no merchantable timber or hardly any remaining in this part of the township.

J. E. A. GIGNAC, P. L. S. (1897).

Township of Tellier

In point of general aspect, this territory is mountainous and broken, presenting in some places rocky cliffs and elsewhere pretty large tracts of land suitable for tillage and easy of access.

The l'Assomption river is bordered on each side by a strip of pretty level land, forming a valley with a breadth varying from a few acres to about a mile. Beyond that, the ground rises gradually, to form at some distance chains of more or less high mountains running generally from south-east to north-west.

Some summits rise to a height of 700 feet above the river. The most of these mountains, however, hardly exceed half this height and offer splendid plateaux and easy slopes clothed with fine hardwood and mixed trees.

The best part of this territory is in the centre and especially on the south-west side of l'Assomption river and lake where the hard wood forests are remarkable as much by their beauty as by their extent.

This spot, first noticed, by the lumbermen, has for a long time past attracted the attention of those interested in the progress of colonizaion in that quarter.

It is now some years since a party of leading inhabitants of the county of Joliette visited this region along with Revd Mr. Bonin, then curé of Saint Côme, when the latter, in order to mark the site of a future church, planted a wooden cross which is still visible on the north-east side of the l'Assomption river as the place called "Round Bay", distant about a quarter of a mile from l'Assomption lake.

Owing to want a surveys and roads, however, the first movement was followed by no practical results.

The soil is generally composed of a yellow loam, more or less sandy, and though certain parts are rocky and unfitted for cultivation, I estimate that more than one half of the total superficies may be tilled with greater advantage than most of the lands in the surrounding townships: Cartier, Cathcart and Joliette, in which have sprung up parishes like Saint Côme, Saint Alphonse and Sainte Emelie de l'Energie, that are to-day prosperous centres.

These last mentioned localities have hardly any more cultivable lands open to location, so that the survey of the projected township at l'Assomption lake has been long demanded and expected.

It is presumable that a large number of settlers will flock in that direction so soon as the lots are offered for sale and a road leading to them has been opened.

The timber most commonly met with in the space tra-

versed is spruce, balsam, cedar, pine, birch, beech and maple.

Among the hardwood trees, birch generally predominates, attaining considerable diameter, thirty inches and upwards; but on the other hand the maple seldom runs over 10 and 12 inches in diameter.

The merchantable timber, spruce and pine has been cut over a little everywhere, but especially near the l'Assomption river and the principal lakes, where numerous traces of the passage of the lumbermen are still visible. Several buildings (old shanties) are still standing.

Nevertheless, there still remain in many places spruce and pine of average diameter.

Like most of the townships, this territory contains a large number of lakes, many of which are not shown on the maps. I have indicated on the plan only those whose position and extent I could approximately determine.

Lac des Iles and l'Assomption lake are reputed to be to be full of fish. In the former, the red or speckled trout are principally taken, while l'Assomption lake further yields grey trout and white fish. It is very probable that the other lakes, although less known, are equally well supplied with fish.

Judging from my own observations, game does not seem to abound in this region. This is, no doubt, due to excessive hunting for some years past. I remarked, however, some red deer yards on the high mountains on the north-east side of des Iles and Cabo lakes.

On the river and in its neighborhood, I came across some rare signs of otter, fisher, fox and marten. Beaver, which appear to have been numerous, have almost completely disappeared.

Although the surface is higher and generally rougher towards the north-west, north-east and south-west extremities, there are still some plateaux, valleys and even declivities which might be cleared and profitably cultivated. Nevertheless, as already mentioned higher up, the best part, from the agricultural point of view, seems to be towards the centre of the projected township and it is presumable that the first settlers will select their lots there or on the banks of the river. It would be therefore desirable to include the whole of this part in the first subdivision ordered.

If account be taken of the course of the river and the trend of the mountains, I think it would be more advantageous, when laying out the projected township in lots, to run the range lines from south-east to north-west. By this method, which would not interfere with the symmetry of the whole, the opening and maintenance of the concession roads would be rendered easier, as they would thus be located in the natural cuts.

As the banks of the l'Assomption river and lake would serve as front lines to the lands bordering them, it would be advisable to have lot pickets planted there.

The opening of a good road being of prime necessity for the settlement of this region, it is not without interest to mention that the portage road, actually existing on the north-east side of the river, has shown that it would be easy to make a first class road to some miles above the lake along the north branch of l'Assomption. It would be sufficient to make a few changes in the actual route, in order to avoid some hills which, however, are not high.

In the township of Cartier, starting from the 5th range, this road would traverse lands, the bulk of which seemed to me adapted to tillage. The settlement of these lands would greatly facilitate the maintenance of the road.

I have indicated on the plan the part that it would be advisable to now divide, as well as the most favorable mode of laying out the lots. The details which I have added have been marked approximatively according to the position of the l'Assomption river and lake, as represented on the sketch furnished to me.

I should remark, however, that my observations with the aid of the compass and the pedometer would seem to indicate that the lake is nearer to the north-east exterior line. Its shape, moreover, is not correctly laid down and the same may be said of certain parts at least of the river. Owing to the uncertainty of these data, I think it would be important to have an accurate scaling made of these streams including the north branch. This work would serve, not only for the mapping and the survey of the projected township, but also for the establishing of the lines of certain timber limits recently sold and the extent of which is not accurately known.

J. A. MARTIN, P. L. S. (1895).

The township of Tellier, called after the honorable member for Joliette, has not yet been surveyed, but its outside lines have been traced as follows : on the south-east for the boundaries between it and the township of Cartier ; on the west for those between it and the township of Lussier ; the north-western line consists of a portion of the main exploration line, traced in 1871 by Mr. Carolus Laurier, father of Hon. Sir Wilfrid Laurier ; the eastern line alone has yet to be traced.

This is the third time a Government officer has been sent to inspect this township.

Mr. Bureau's exploration.—The first report was made in 1884 (December) by Mr. Joseph Bureau, the well-known explorer. In his report, Mr. Bureau completely rejects the township of Tellier as "being too hilly and rocky for colonization purposes, although the soil is not too bad in some places," and he adds that, as lots for cultivation, there cannot be more than 30 or 40 lots of 100 acres each, within the limits of the townships, but, as those good lots are scattered about, there is no spot where there is a sufficient area to allow of colonization.

It should be observed here that, according to Mr. C. E. Gauvin's estimate, the total area of the proposed township, would be 42,000 acres, whereof 2,000 would represent the approximate area of the lakes and streams. Hence there would be 42,000 acres, whereof 2,000 would represent the acres, 380 lots, whereof barely 40 (a very small number) would be fit for cultivation.

Second exploration.—In the month of January, 1895 a second exploration was made by Mr. Martin, land-surveyor and Crown Lands agent, at Joliette, and the latter, in his report, informed the Department of Lands and Forests that "more than one-half of the total area (say 10 lots) could be cultivated for greater advantage than most of the lots in the adjoining township."

In consequence of this report it was decided to have the township surveyed, but, at the last moment, that decision was altered, and it was fortunate, for as we shall see, lands mostly unfit for cultivation were about to be given over to the settler's axe.

Third exploration.—At the beginning of this year, Hon. Mr. Turgeon received a petition from some inhabitants of St. Côme, asking that the township of Tellier be surveyed. In view of the previous contradictory reports, a third exploration became necessary, and I was instructed to make the inspection.

But not wishing to rely only on my experience in deciding whether the soil of the township of Tellier was good or bad, I sent to Mr. Shutt, the distinguished chemist of the Ottawa Experimental Farm, all the samples of soil gathered during the expedition, to have them analysed. Moreover, to do justice to all—because, while the settlers alleged that the township was suitable for settlement, the limit-holders alleged the contrary,—I took with me Mr. J. Baril, representing the lumber companies interested, and Mr. Elie Jean Venne, one of the petitioners, whose name was given me by Rev. Mr. Jacques, the parish priest of Saint Côme.

On the 18th July, 1907, we started from St. Côme village, for the township of Tellier. We soon had to give up our vehicle and use "jumpers," a sort of sleigh without iron runners, the only thing that can be used on those roads full of stones.

The distance from the village of St. Côme to Assomption lake is 24 miles, following the portage road, which, as a rule, runs beside the l'Assomption river, never leaving it more than half a mile.

Township of Cartier—We thus crossed the township of Cartier, throughout its entire length. It is difficult to imagine a poorer country. The soil is yellow and very sandy loam, mixed with many stones. There are a great many boulders. The vegetation is very inferior. I was astonished to see to what an extent the lumbering operations carried on here a dozen years ago, had ruined the forest. Thus, although our regulations forbid the cutting of spruce under a diameter of eleven inches at the stump, except in the case of black spruce, we found but few trees of a diameter exceeding eight inches. On the other hand there is an abund-

ance of balsam fir measuring as much as twelve inches. Thus we have the evolution of the forest towards a type always of lower quality than the previous one. At first the pine was cut, then the spruce, and now only second class timber remains. A better observance of our regulations respecting the cutting of timber would have prevented to some extent the evil just referred to.

But little damage has been done by fire here during the past ten years. This is due to the excellent organization of the lumber companies.

On the Lavigne river I noticed some good lots and, according to the settlers, whom I questioned, some twenty lots fit for cultivation might be found in the valley of that river. The distance from that spot to the village of Saint Côme is eight miles at the most, but as all the merchantable timber has disappeared (there is still a good deal of fine black birch), no application has been made for those lots, while those of the township of Tellier, twice as far away, are wanted. The latter, however, are richly timbered!!!

Township of Tellier.—The portage road enabled us to go as far as the dam; beyond there we had to use our shoulders to reach lake l'Assomption, where we wished to camp.

To explore the township of Tellier I adopted the wheel-spoke system, a method of exploration frequently followed by American foresters. One of the cardinal points is generally adopted for direction. Thus we started every morning, going sometimes west, sometimes north, etc., then, following always the same direction, we went to a short distance from the boundaries of the township. To return, we followed a broken line which enabled us to see the land

outside of our first direction. A good compass is indispensable for such work. Counting my steps (we had considerable practice in this sort of measuring in Missouri and some of us could measure a mile within some ten feet). I could thus ascertain the distances fairly accurately and even make a small map of the region we crossed.

In my field note-book I recorded my observations on the conditions of the soil, the topography of the country, the state of both forest and spontaneous vegetation

Wherever the soil changed, we dug several holes to study its physical characteristics: structure, texture, color, thickness of humus, of the vegetable soil, of the sub-soil; the stones in the soil or on the surface, etc. When we found a new kind, we carefully cleared the surface of the soil and took a sample.

To judge of the productive capacity of the station, I had typical trees notched or cut down. Trees, by the difference between their yearly layers, give valuable information regarding the richness of the soil. Such information is much more reliable than that given by the exterior of the tree; thus two trees may be of the same diameter; but there may be a very great difference in their ages.

I was thus able to gather 21 samples of the soils of that township which I sent to Ottawa to be analyzed. Each sample was accompanied by a special sheet, on which I had copied out the notes I had taken in each case.

Here is a copy of one of such sheets.

SAMPLE No. 7.

OF THE VIRGIN SOILS OF TELLIER TOWNSHIP

Situation.....	Taken at about $\frac{3}{4}$ of a mile, in a S.E. direction from the northern end of Lake l'Assomption, behind Bois Franc mountain.
Altitude.....	From 300 to 450 feet above Lake l'Assomption, say from 1,500 to 1,650 feet above sea-level.
Slope.....	Steep.
Topography.....	Broken, with a few small plateaux.
Exposure.....	South-east.
Rocks.....	Very abundant. Many boulders ; frequent outcroppings of gneiss.
Soil.....	Apparently poor. Humus, 3 inches. Yellow sandy soil, fine, 14 inches mixed with gravel.
Sub-soil.....	Yellow sand, very fine, containing small stones. Subjacent rock crops out in many places.
Drainage.....	Generally rapid ; the soil is exposed to wash away.
Spontaneous vegetation.....	Fairly abundant. Smilacina. Buxus. Ferns.
Trees of no value.....	Mountain maple, Viburnum, Hazel.
Principal growth.....	Spruce with a few small groups of hard wood trees. The spruce is of good size. The black birch is sound. A few white pine trees.

NOTE. — Too rocky and broken to be suitable for cultivation.
This sample represents about 900 acres.

I may be pardoned for dealing, at such length, with the methods I followed in studying the soils of Tellier township. But, in view of the many recent criticisms regarding the efficacy of the classification of soils in the Province, I consider myself justified in describing the system followed and the care taken to give an impartial and accurate report. I do not mean to say that my method is perfect, but I am convinced that by carefully inspecting a township, by examining its forest and spontaneous vegetation and taking good samples, which are afterwards examined by a competent chemist like Mr. Shutt, one should certainly make a classification that should give satisfaction to all persons taking a *bona-fide* interest in the matter.

I would here observe that many applicants for lots of land usually visited them in winter, because they were easier of access at that season. I designedly indicated the time of the year when Mr. Martin made the second exploration of this township. To my mind winter is the worst season for classifying soils. It is then impossible to thoroughly examine the flora; all the shrubs are hidden under the snow. So are the rocks, and there are a great many in Tellier, especially in the hard wood tracts. Moreover, how can one get good samples of soils for their hygroscopic qualities cannot be accurately determined when they are frozen. The drainage is also concealed. No; classification must be effected when nothing is hidden from the explorer's sight and when the forest flora shows itself in all its vigor. The best seasons, therefore, are spring and autumn.

DESCRIPTION OF THE TOWNSHIP OF TELLIER

Topography.—The country is very broken. There are many high hills here, such as Baril Mountain, Caesar Mountain and Cape Horn, whose summits are more than 750 feet above the waters of l'Assomption river. The latter

is bordered on either side by a small plain, timbered with spruce and white birch; then a gentle slope takes one to a small plateau which I consider to be a former terrace of l'Assomption lake; this terrace is about forty feet above the lake. Then come the mountains whose general trend is from S. E. to N. W.

The rocks belong to the archaean age. The most abundant are gneiss (mixed with hornblende or garnet) and granite. Near the dam is a strip of crystalline limestone, impregnated with mica and syenite.

Rocks.—The rocks belong to the archaean age. The most abundant are gneiss (mixed with hornblende or garnet) and granite. Near the dam is a strip of crystalline limestone, impregnated with mica and syenite.

Rocks crop out in many places. They form high ridges on the west side of the river, some, which are almost perpendicular, are over 35 feet high.

Soils and Mr. Shutt's report.—The soils are all of morainic origin, with the exception of some alluvial soils found north of l'Assomption lake. Those soils are all very poor, with the exception of those found in the hard wood sections. Unfortunately, those good soils are scattered about, and nearly always at altitudes of from 1300 to 1725 feet above sea-level and are consequently liable to frost. It would be hard to find 80 lots of 105 acres out of a total of 380, or barely 21 per cent of the total area.

Moreover, as the chemist of the Experimental Farm so positively says, those sands are of a transient character and require special cultivation, which the poor settlers of the North could hardly give. It is better, therefore, to leave them to lumbering.

Water system.—A second reason for leaving those lands in the forest reserves is supplied by an examination

of the water system of l'Assomption river. That river begins a little above the line of Laurier; its two branches unite a little below l'Assomption lake; then the river is increased by the waters from the chain of lakes Caisse, Pivelé, Poisson Blanc, à la Truite; lower down the Alfred river pours in its tribute. South-east of the township of Tellier is the immense sheet of Lac des Iles, which, with the other lakes around it, discharges further south into l'Assomption river. Thus, from a mere streamlet at its entrance into the township of Tellier, the l'Assomption river becomes a considerable stream. It is thus undeniable that we have the source of that river here.

It is admitted by all that the removal of the forest from the soil produces great changes in the course of a river. The l'Assomption river has not escaped that law. The freshets in the spring are becoming more and more violent; the floating of logs, which formerly was very easy, has now become a difficult operation, necessitating a number of dams to keep back the water from the melting of the snow; the water-powers no longer have the same power as they had. Thus the Copping saw-mill, to cite only one, is compelled to use steam in the month of July, while their turbines formerly supplied sufficient power to run the mill until winter.

It is, therefore, necessary to protect industry. The town of Joliette has become an important centre and its manufacturers need protection. The economic importance of the township of Tellier lies chiefly in this; we have there the sources of the river and too many pieces of sterile land have already been cleared of timber in that direction without wasting any more. It is, therefore, better to keep them with the timber on, such as they are.

No virgin forest is to be found in that township; all was cut away over thirty years ago.

In the lower part of the township, from Alfred river to Baie des Merles, and in the direction of Lac des Iles, I found the same thing as in Cartier; the balsam fir seems to be striving to invade those woods. In my opinion this is due, in a great measure, to the fact that timber of small diameter has been cut in those places.

The forest consist of groups of three distinct types : soft wood timber, mixed timber and hard wood timber.

Soft wood timber.—The greater portion of the township was formerly covered with this, but fire, wind and ill-directed lumbering operations have favored the introduction and invasion of hard wood trees. Not more than 35 p. c. of the township is now covered with soft wood timber.

White spruce (*Picea alba*) is the predominant tree of the group. It is generally mixed with black spruce (*Picea nigra*), pine and cedar.

This type is chiefly found at the foot of slopes, in the low plain along the river. It is also met with on the top of Mount Baril and Mount Villeneuve.

Spruce here attains a diameter of 15 or 16 inches. White pine (*Pinus strobus*) and red pine (*Pinus resinosa*) which form small groves, are small in diameter, 14 inches at the stump, for they were formerly cut down without pity. White cedar (*Thuja occidentalis*) grows well in this group; it is generally lost in the mass of the forest. It is generally stunted, which takes away much of its value. I think this is due to the poverty of the soil. Balsam fir (*Abies balsamea*) is very abundant in the spots where lumbering was done, but it is still of small size, from 4 to 7 inches in diameter at the stump.

Mixed timber.—Under this head I include the mixture in variable proportions of the coniferous and leafy trees,

while no group exceeds 60 per cent of the whole. These mixed groups constitute 40 per cent of the forest. All the trees are of good size here.

Spruce and hard maple dispute with one another for the ascendancy. Both very tolerant, these two kinds, after having been dominated over for many years, rise up to the light as soon as their competitors disappear. Lumbering will certainly favor the expansion of the maple and also of the other hard wood trees that cannot be floated. That is a misfortune, for maple here is of modest diameter, from 13 to 15 inches at most, while spruce attains as much as 27 inches. Black birch and white birch come immediately after, with diameters of 24 and 26 inches. Some fine white pine trees are still found, whose inaccessibility has saved them. Balsam fir is sounder here, and its diameter is greater than the preceding type.

Hard wood trees.—The last group is characteristic of the plateaux found on the top of the mountains and on the flanks exposed to the east. They are splendid trees, all very straight, and of fair diameter. Owing to the difficulty of floating them, they have fortunately been spared until now.

The list of trees found here is a fairly long one and the development they attain at those heights is remarkable. Thus, red oak (*Quercus rubra*) grows here at an altitude of 1600 feet; I measured one tree which was 23 inches at the stump. The iron wood (*Ostrya Virgiana*) was found rather frequently and was generally from 8 to 11 inches in diameter. The mountain ash (*Sorbus aucuparia*) also had a diameter of from 8 to 10 inches.

The king of the group is the yellow birch (*Betula lutea*). Some of the trees here measure as much as 30 inches in diameter. White birch (*Betula populifolia*) and paper birch (*Betula papyrifera*), although less abundant

than the foregoing, showed some fine specimens, with a diameter of as much as 24 inches. Hard maple (*Acer saccharum*) is yet of small diameter, rarely exceeding 15 inches. Reproduction is very good and its existence seems the surer. The trunk of the tree is, however, out of shape. Beech (*Fagus atropumicea*) is plentiful, but the trees are frail ; it seems to suffer from the cold.

Lumbering operations.—As all the timber is taken out by floating, only the soft wood trees are cut. This is exceedingly unfavorable to that kind, for it favors the expansion of the hard wood trees, which are given every opportunity for seeding wherever the others have been cut down, while all the coniferous trees are removed without leaving any seeds. Every lumberman who wishes to perpetuate his forest, should leave at least two good seed-bearing trees per acre. Pine, owing to the strength of their roots, might easily be chosen for this purpose for the roots of spruce especially are very superficial and they would certainly be overturned by the wind, when the space around them is cleared. It is better to leave some small clumps of a hundred trees, in places where they are not too much exposed to the wind. As balsam fir has a tendency to invade the limits to the detriment of other coniferous trees, I think it would be advisable to cut it at a diameter of 7 inches at the stump.

Debris from the cutting.—I noticed with regret the immense quantity of debris in the old lumber clearings. To reach Cape Horn I had to cross one, which my guide told me was 20 years old. It was surprising to see the loss we experience through such cutting. Whole trees had been cut down and only one log taken. The branches were still strong enough to impede one's passage, while if the simple precaution had been taken to cut all that were not in immediate contact with the soil, they would have rotted long ago, while at present they are a source of danger from fire.

I think the lumbermen should be compelled either to burn all the refuse or to cut off the branches from the felled trees; otherwise we shall retain in the midst of our forests a constant source of danger from fire.

Conclusion.—To sum up all I have said, it may be stated that the township of Tellier contains soils too poor for agriculture and, as those lands are of great importance for the maintenance of the water system of l'Assomption river, it is better to keep them for lumbering.

G. C. PICHE, F. E. (1907).

REPORT ON SOIL FROM TELLIER TOWNSHIP

This series consisted of 21 samples, stated to represent the various types of soil in the township of Tellier. This township is as yet unsurveyed and unsettled, and the special object of the present examination was to ascertain how far the chemical analysis of these soils would justify the throwing open of this district for settlement; in other words, to learn if such data would give promise of successful, profitable agriculture.

These soils might all be classed as sandy loams, clay and silt being present in negligible quantities, (practically traces) in the majority of the samples, and only in very small proportions in a few of them, say four or five. These loams, then, are essentially made up of sand, principally of a coarse grain, with some gravel, associated with variable amounts of vegetable matter. Judging from the samples as received from Mr. Piché, the greatest number of these soils would be considered as decidedly poor for general farming purposes, and such chemical determinations as we have been able to make strongly support this conclusion.

With the exception of 4 or 5, analysis has shown that these loams contain but small amounts of vegetable matter (humus) and nitrogen, and since these must be considered two of the most important soil constituents—especially from the standpoint of maintaining fertility or productiveness over a period of years, I am of the opinion that unless carefully and rationally farmed, they would in time become, in a large measure, unprofitable for general cropping.

It must be borne in mind that in the clearing of land, fire is usually most recklessly used. This, unfortunately, destroys and dissipates to a greater or less degree those very constituents—humus and nitrogen—which have accumulated through centuries, and which now give to those sands their power to sustain vegetable life. The burning of such light loose-textured soil is most disastrous, very frequently penetrating to the subsoil, leaving but little, save ash elements, of plant food that may give fair crops for a season or two and are then exhausted or leached away. Following such a course we have a soil, if such it can be called, that cannot be farmed with profit and that can only be slowly restored to its virgin fertility by more or less expensive measures. Large areas now exist in Canada that are practically barren, or at all events unprofitable for agriculture, by reason of the injury caused by fires in clearing—areas now abandoned, but which of course in time, by the operations of nature, slowly covering the soil with vegetation, may eventually regain their fertility. It is, therefore, of the utmost importance that our settlers on uncleared lands should be instructed in this matter and that they should clearly understand that the less fire that can be employed the better and more lasting will be the soil. Attention has been called in the most emphatic way of recent years to the destruction of our valuable forests by fire; but, unfortunately, little or nothing has been said as to the destruction of the fertility of our virgin soils from this cause.

In conclusion, I would say, after a careful examination

of these soils and of the very complete notes on them and their present vegetation furnished by Mr. Piché, that it appears to me that this area would, under a rational system of forestation, yield better financial results and in every way prove more satisfactory than it thrown open to settlement for agricultural purposes. Undoubtedly, some of the samples betoken soils that could be profitably farmed; but certainly the largest number of them indicate that, if they were severely burnt over, their productiveness would be of a very transient character.

FRANK T. SHUTT, Chemist,
Dominion Experimental Farms (1907)

COUNTY OF MONTCALM

Township of, Archambault

The quadrilateral I explored covers an area of over 5,000 acres, for it comprises all the lots, from 18 to 36, in ranges 3, 4 and 5 of that township.

The whole of that region is under timber license, the grantees of most of the lots in question being the Charlemagne and Lac Ouareau Company, of Montreal, while the remainder is leased to the Perley Company, of Ottawa.

On the plan sent me by your Department, that section was designated under the name of Black Mountain and, in fact, the Black Mountain covers the whole of that area.

That gigantic mass, beginning at Lake Archambault, by slight undulations (lots 1 to 4, range III) rises rapidly to 800 feet above the waters of the lake, then, continuing to the south east, slopes down gradually. About a mile from the shores of Lac Original it forms a steep cliff, over 300 feet high, and, sloping very sharply, ends at the swampy plain bordering on the lake at that side.

On the south south-east side, the Black Mountain connects with the extension of another mountain, called La Corniche, forming a valley almost entirely shut in. On the west its sides, furrowed by many streams, are sometimes steep and sometimes slope gently and form the eastern slope of the basin of the Michel river.

There are two small lakes on the top of the mountain (5th range) and many streams, falling in cascades, feed the lakes in neighborhood, such as Lakes Noir, Original, Raquette, Simon, Archambeault.

The soil is very damp and thickly covered with moss. It is unfortunately shallow, consisting of sandy, yellow

earth, mixed with large round stones. Moreover there are too many large glacial boulders (from 1 to 3 feet in diameter). In the 5th range there is quite a cluster of them.

It is, therefore, entirely out of the question to send settlers there. However, outside of that area, in the 6th range, the country seems more level. In fact, I am told that the lots at the mouth of the Michel river are suitable for colonization.

The whole of this mountain is covered with fine virgin forest, except that the pine there was cut many years ago by Pope & Co. That is what inspired the petition sent you by the so-called settlers. Their true intention is to steal the timber, as has already been done by other speculators in the upper portion of the townships of Lussier and Archambault.

Description of the forest.---The forest covering the whole of the Black Mountain, with the exception of the steep cliffs, may be classified into three distinct groups: hard wood timber, soft wood timber and mixed timber.

The hard wood timber, as a rule, grows on the rounded parts of the ridge, as well as the gentle slopes at the top of the mountain sides. The ground is covered with enormous boulders, to such an extent, that it is unfit for cultivation. The trees of this group are the yellow birch (*Betula lutea*), white birch (*b. populifolia*), paper birch (*b. papyrifera*), sugar maple (*Acer sacharum*) and beech (*Fagus atropumicea*).

Yellow birch predominates in this group. It alone attains great dimensions (from 30 to 35 inches in diameter) at a height of $4\frac{1}{2}$ feet from the ground. Unfortunately it forks too soon, and it seldom happens that more than two logs of 12 feet can be got from it. The branches and upper portion supply excellent fire-wood.

White birch is much scarcer than the other and generally grows in more moist spots. It grows to a diameter of 25 inches, 4½ feet from the ground. It is highly appreciated as fuel.

Paper birch is still less abundant. Some specimens measure over 20 inches in diameter and our guide said they yielded bark enough to make a canoe. This tree is much used for making spools.

Maple comes next in order after birch as to quantity, but is always small, seldom exceeding 15 inches in diameter, 4½ feet from the ground. It is more generally distributed than the other hard wood trees and its reproduction is also abundant, so much so, in fact, that I have no doubt that when the present trees disappear, the groups will be transformed into sugar maple groves. There is much birds-eye maple, but the market is so far that the settlers burn logs that cabinet-makers would be glad to have.

Beech is less abundant than maple, and also seems less hardy. It is always found in groups, consisting almost entirely of nothing else. Its dimensions are slight: 14 inches in diameter at the most. The wood is not sound. Its reproduction is weak. That, too, will disappear as the maple increases, because the country is too cold for it.

The soft wood or coniferous trees are represented here by black and white spruce, and balsam fir. A few pine trees, remaining after the lumber operations of Pope & Co, appear here and there on the heights. There is still a little white cedar of stunted growth.

White spruce (*Picea alba*) is found everywhere, from the foot of the mountain to its top, sometimes alone, sometimes in clumps of from one hundred to some thousands of trees. It grows very well here, and in the valley of the Michael river, I saw some splendid specimens measuring

28 inches in diameter, $4\frac{1}{2}$ feet from the ground, which could give about five logs.

Black spruce (*Picea nigra*) grows more in clumps than the other and chiefly in moist ground. It is particularly abundant on the northern slope. It often grows with white spruce and its growth is then very rapid. I measured one tree which was 18 inches in diameter, $4\frac{1}{2}$ feet from the ground.

Balsam (*Abies balsamea*) abounds in the lower parts of the mountain, in lots 18 to 12, range III, where a little has been cut (by accident?). That tree seems endeavouring to substitute itself for spruce, so great is its reproduction. Its diameter, however, seldom exceeds 14 inches, $4\frac{1}{2}$ feet from the ground. Many trees are attacked by dry rot, which gives the heart of the wood a reddish color; this has given rise to the variety called "red fir."

White cedar (*Thuya occidentalis*) is represented only by a few specimens, generally thick at the base, being from 16 to 25 inches in diameter. This tree prefers the rockiest places, provided they be moist; its roots grow around the boulders, however large they may be, and descend into the soil to obtain nourishment.

It is remarkable that this region should contain no hemlock.

The mixed timber consists of both groups, whose proportion varies according to situation, and covers the greater portion of the mountain. Hard wood trees predominate when the ground is less broken. The soil here is very rocky and, although deep enough, is not suitable for agriculture. White spruce and black birch attain their maximum development here.

To sum up, the Black Mountain has very broken soil, too rocky for settlers who are in earnest. I am convinced

that when the ground is cleared, under the energetic action of the rains and owing to the steep slope, the water will stream down rapidly and quickly wash away the soil. To this may be added the difficulty of working a soil with such a steep slope and so covered with boulders. It is better, therefore, to set this area apart for growing trees; this alone can maintain the fertility of such poor soils and protect them effectually against the effects of erosion and also properly regulate the water system. Moreover, game of all kinds would find a suitable asylum and multiply there.

I, therefore, have the honor to suggest, respectfully, that that section be not surveyed, but be reserved for reforestation and as a hunting territory.

G. C. PICHE, F. E. (1908).

Township of Chertsey

I surveyed part of the division line between the 9th and 10th ranges of the township of Chertsey which lies to the north-east of the lots bordering on the river of Ouareau lake.

This part of the township is mountainous, but still contains a good deal of merchantable timber.

J. D. A. FITZPATRICK, P. L. S. (1896).

Townships of Lynch and Nantel

In general, the surface is hilly, but nevertheless presents large, level and very advantageous spaces. These townships are susceptible of settlement nearly all over. The principal mountainous spots are at the starting point of the

centre line on the north side of Lac Chaud, to the range line between the fourth and fifth ranges of Nantel, a little to the east of the centre line at the north-east corner of Lynch, near the Rouge river.

Heavy clay land is met with between the fourth range of Lynch and Lac Chaud; Sigouin's house is covered with clay. This part is particularly suitable for settlement; in two days, we were able to cut out a road between Sigouin's house and Lac Chaud and conveyed our baggage over it in a vehicle drawn by two horses. This road is marked on the plan; it would be a real short cut in winter to communicate with the mill which is erected on the Macaza river in the township of Marchand.

Another favorable spot occurs near Ackerson lake.

In general, the valley of the Chaud brook is suitable for settlement as is also that of the Macaza river.

Between the latter stream and the Cold brook, there is a fine tract of hardwood bush.

The lakes abound with fish and hunting seems to be profitable, for we met a hunter camped on the banks of Sugar lake. That hunter told us that South Sugar lake, instead of being situated at the point indicated on the plan included in my instructions, lies at least two miles more to the eastward. He stated that he saw a post there, which may possibly be the one indicated as on the Laurier line, and that the land was fine in that quarter.

Lumbering is being carried on this winter in the north-east corner of Lynch; the lumbering roads are numerous throughout all these townships, which shows that traffic is easy in them.

J. H. LECLAIR, P. L. S. (1897).

Township of Mousseau

The survey of the following ranges 6th, 7th and 8th of the township of Mousseau, was carried on according to instructions.

The surface of the country over which extend ranges 6, 7 and 8 is generally high, undulating and hilly.

The soil is of a good sandy nature, all fertile and similar to if not richer than that under cultivation in the front ranges of this township already surveyed and upon which there are considerable settlements.

Part of ranges 6 and 7, from lot 1 to 30, and part of lots 8 and 9, from lot 3 to lot 30, are the most favorable for settlement. The balance of those ranges north of the centre line, though generally high and hilly, contains considerable arable land upon which there is a large quantity of valuable hard and soft timber, principally spruce of large dimensions, and balsam, the hard wood being mostly yellow birch and maple of large size.

The spruce and balsam trees are being removed on parts of these ranges to the south of the centre line generally near a large creek known as Lantier creek, by the Riordan Company, of Hawkesbury, Ont.

There are several large creeks running through those ranges : Pike creek in the extreme south ; Lantier creek towards the centre of the township and Vert creek in the northern part.

The two former ones are used to float logs and timber to the Rouge river.

There are a number of rapids too numerous to mention on Lantier creek which might be used as power sites for saw-mills, etc.

There are several lakes within these ranges, though

none very large excepting Lac Vert in ranges 8 and 9, which is a large body of water partly within this township.

No minerals of value were found. Fur-bearing animals were seen such as beaver, mink, otter. The only large game seen was the deer common to the country, which were apparently numerous.

No wolves were noticed or heard. The magnetic variation was found to be 14o. west of north.

The advantages for settlement in this locality are excellent, there being a village, with a surrounding rural population of about sixty-five families, situated on the front of this and adjoining townships on the Rouge river, called "l'Ascension" where there are a R. C. church, post office and stores, also other places of accommodation and within 12 miles approximately of the railway at L'Annonciation, a village further down the Rouge river.

E. J. RAINBOTH, P. L. S. (1904).

COUNTY OF OTTAWA

Township of Blake

The part of the township of Blake traversed by me is in general of unattractive aspect to the settler in search of a site for a farm. The surface of the land is very broken and in many places even mountainous and rocky.

Fire has at different times swept over great areas of it, where there remain to-day, apart from a few bare pines, only briar and bushes growing between the half consumed trunks of trees which cumber the soil. The coating of vegetable soil which covered these lands has disappeared in many places, where there is now only the bare rock to be seen.

The sections which have suffered most by these forest fires are the 5th, 6th and 7th ranges, on a varying width of two to three miles, to the south of the centre line ; the 10th range, throughout nearly all that is surveyed and the part of the 7th, 8th and 9th ranges which are in the neighborhood of Great Commissioners' lake. The remainder of the territory which escaped the ravages of the fire is also broken and, in general, rocky. •However, small valleys and plateaux of cultivable land are to be met with here and there in it.

I should make special mention of the part situated to the north-west of Bear lake, which contains a certain extent of excellent level land. Both banks of the discharge of this lake are made up of a very clayey soil, wooded in great part with ash, elm and alder. Unfortunately this valley, which extends a little to the north of Bear lake, comprises only a few hundred acres in superficies.

The hard-wood plateaux, met with in the 9th range, at both extremities of the 5th range and in the neighborhood of the Blake-Cameron line, are formed of good yellow earth,

which^c probably might be cultivated to advantage, although somewhat rocky.

The good pine, which was abundant in this region, appears to have been cut off everywhere by the lumber merchants, who, to facilitate the getting out of the timber by the small streams, constructed important works, the traces of which are yet visible.

There remain here and there, in spots spared by the fire, a few groves of pine mixed with cedar, hemlock and spruce, mostly of small diameter.

The balsam fir, which occurs almost everywhere is too small to be profitably worked.

The other woods are, according to the order of their abundance : maple, birch, basswood, ash, elm, white oak and grey walnut.

The lakes are numerous and teem with fish such as bass, white fish, grey trout, pike, etc. When I passed through the first named, fish were easily taken with the line in all the lakes in which I had occasion to try for them.

Great Commissioners' lake was formerly fished by traders, who took out of it large quantities of different kinds of fish, captured most of the time in contravention of the laws. Nevertheless, though it is pretended that this lake has greatly decreased in value, it is far from being exhausted and, now that it has been leased, it should rapidly restock itself, if the regulations, as there is every reason to believe, are better observed.

The fur-bearing animals, whose presence I recognized were the otter, mink, muskrat, wild cat and bear.

The red deer are still abundant enough to attract sportsmen, who come from afar to hunt it. Unfortunately if the present practice of using dogs for this sport be continued,

it is to be feared that these interesting animals will disappear in a few years.

Partridge are very common in this region and a pretty large trade is done in them.

The only houses, actually existing, are in the 9th and 10th ranges at the points indicated on the plan. The most of these settlements are old and some of the resident settlers have pretty large farms under cultivation.

The clearings, which were formerly on lots 29 and 30 of the 7th range and which still bear the name of "The Little Farm", have been long abandoned. Bushes now grow freely upon them.

However, there appears to be a serious movement setting in for the development of this settlement, which has long remained stationary.

A young settler, J.-Bte. Ladouceur, has begun to make clearings on the west shore of Bear lake near its discharge. I have been told that a dozen lots have been taken up by different persons at the same place.

Other settlers are preparing to take up lots in the sugar-bushes of the 9th range, at the extremity of the present settlements.

A practicable waggon road has been built to the discharge of Pemichangan lake, where a grist mill and a saw mill are in operation.

The running of the Ottawa and Gatineau Valley Railway, whose track is only distant some 12 miles, will, doubtless, contribute much to secure for this township all the development, of which it is susceptible.

J. A. MARTIN, L. S. (1895).

I proceeded to the survey of Blake and town line between Blake, Hincks and Northfield, and town line between Blake and Northfield, and also the range lines of the township of Blake and short portion of Hincks and Blake, all in the county of Ottawa.

In the survey of this large and valuable country, I found much good arable land, timbered with large ash and other valuable timber, large quantities of pine logs having been taken out this last winter.

Phosphates and other minerals are indicated by me on the plan filed in your Department and accompanying the field-notes of the above mentioned surveys. I may further remark that along the shores of Pemichaugan lake, there are good indications of minerals which I think should be examined by experts. Some farmers in the tenth range of Blake have sold their mining rights, the purchasers having, I believe, acquired them not only for phosphates but on account of strong indications of gold and silver.

J. JOHNSTON, P. L. S. (1889).

Topography.—A great part of the country around Lake Pemichaugan has been devastated by fire, and is now a desolate waste of frowning crags; some spots, however, like the Dixee and McLaren farms, are very inviting.

In the neighborhood of the centre line east of "Thirty-one miles lake" there appear to be some stretches of very good land, and also along the discharge of Bear lake.

In the first range, along the du Lièvre river, there are some very good alluvial flats; but in the second and third ranges, north of the centre line, the mountains rise to a great elevation. In the third and fourth ranges, south of

the centre line, there are some good spots, but on approaching O'Hara lake, the country is again a wild rocky waste.

Timber.—The mountains in the front part of the township appear to be well timbered with birch, maple, beech, spruce, oak, pine, etc., and in the valleys and mountain gorges I saw beautiful ash, elm and bass-wood.

On lot No 25. in the third range of Blake, I saw the largest and best piece of squared pine ever made to my knowledge in that region. The tree was only about four feet diameter on the stump, but it measured one hundred and fifty feet in height, or length, and was straight as an arrow. In falling, it broke at sixty-four feet from the butt. This was squared in one piece $26\frac{1}{2} \times 27\frac{1}{2}$ inches, by sixty-three feet in length, containing about three hundred and eighteen cubic feet of first quality timber without crack or fault, except two very small sound knots about eight feet from the top end.

This timber was made for Mr. McLaren, by a man named Joseph Clement, of Victoria, township of Northfield. He intended taking it to Bear lake with three teams of horses, and thence through "Thirty-one miles lake" to the Gatineau river.

I saw some splendid trout weighing from five to ten pounds taken in Trout lake.

The discharge of this lake passes under ground into Little Bear lake.

There are several lakes in this township that have never been surveyed.

A remarkable freak of nature is seen near the portage between Pemichaughan lake and "Thirty-one miles lake".

These two lakes are connected by the natural discharge shown on the plan, east of the VIII-IX range line, where

there is excellent water-power, there being about twenty feet of fall with the whole of Pemichaugan lake to draw from.

A short distance west of the said VII-IX range line, there is a lost channel of greater volume than the natural discharge. This flows underground for a distance of several chains, passing under a hill some fifty feet in height, and re-appears in a beautiful clear stream, about twelve feet wide and two deep, falling into the most southerly bay of "Thirty-one miles lake".

Lake Pemichaugan is about one hundred feet above the level of the Gatineau river, at the Lake Saint Mary road ferry, and twenty above "Thirty one miles" lake. These lakes are well stocked with large trout, pike, white fish, doré, etc.

H. O'SULLIVAN, I. S. (1889).

Township of Bouthillier

I have the honor to report that the survey of the following ranges 7, 8, 9, 10, 11, 12 and 13 was carried out according to the instructions issued by your Department.

In the course of carrying out the same, I observed that there is large tract of arable land in the township extending from Lac du Camp in the southern part and extending in a north-easterly direction to Lac des Iles.

The soil is a sandy loam remarkably free from boulders or stones, though, on some of the level stretches, it is of a light sandy nature, but, is all good for cultivation.

The most valuable timber such as pine and spruce has been cut by the lumber firms operating in the district.

The best of arable land extends through and along the whole length of lots in the 10th, 9th and part of the 8th range near the southern line and extending through those three ranges and part of the 7th range north-easterly to Lac des Iles.

The northern portion of ranges 9 and 10 is generally hilly and rough land, as is also range 7 and part of range 8 south of the centre line.

Ranges 11, 12 and 13 are situated on the height of land between the Lièvre and Gatineau rivers, and, though in places rough and hilly, contain numerous stretches of tillable land.

The timber in the 11th, 12th and 13th ranges is mostly yellow birch and maple with scattered spruce and balsam.

There is still considerable timber in this part of the township such as cedar, spruce and balsam, which will no doubt be all cut by the lumber firms who are operating on a large scale in the locality.

There are a number of small lakes as shown on the plan accompanying this report, as well as a large creek, about 75 links wide, which passes through the township, entering from the north in range 10; thence easterly and southerly through range 9 and again into range 10 to "Lac des Ours" and "Lac la Dam", and from the latter lake to its outlet in Lac du Camp.

The proposed road to Maniwaki is intended to follow the winter road shown on the plan, which is a fairly good portage, from the Joseph river near the end of the existing waggon road from Maniwaki, and leads to Lac des Iles and Wabasse, P. Q., on the du Lièvre river.

There are a few settlers in the 9th and 10th ranges near "Lac du Camp" and "Lac des Ours" and towards the north near the end of the 7th and 8th ranges near Lac des Iles.

There were no minerals of economic value observed during the course of the survey. The rock formation is granitic.

Fur-bearing animals were found to be scarce excepting wolves, which were numerous and were playing havoc with the deer which from common report were very plentiful a few years since, but at present time appear to be getting scarce in this locality.

There are several large bodies of water such as Lac des Ours, Lac la Dam, a part of Lac du Camp and a large part of Lac Serpent, which lies on the town line of Bouthillier and Kensington.

E. J. RAINBOTH, P. L. S. (1905).

This township is very hilly. There are, nevertheless, severable places suitable for farming, especially, around Lac du Camp and Lac des Ours and along the Lac des Iles road.

J. O. LACOURSIERE, P. L. S. (1905)

Township of Boyer

The land is of first quality for cultivation, but a little mountainous in some places. The wood is chiefly maple, which covers more than half the surface of the township.

Spruce also occurs in pretty large quantities. There are no fish in the lakes and streams.

L. P. DE COURVAL, P. L. S. (1897).

Township of Campbell

Almost the whole of the land which I surveyed, with the exception of some mountainous parts of the borders of lake No 3, is of good quality and very suitable for cultivation. The portion of ranges III and IV, from lot twenty-three northwards, especially, is first class, the land slightly undulating, covered with a forest of hardwood trees composed of birch, maple and bass-wood; cedar and balsam are found in the low grounds, but not enough to be unfit for cultivation.

The south part of ranges II and III is generally good land, but there are low places on lots twenty-two, twenty-one and twenty, where the timber is balsam and black and red spruce; apart from these the rest may be considered of first and second quality. This land is not very rocky; on the borders of lake No 3 there is also some good land; and certainly when civilization shall have reached these parts, the portions now considered of no value will be looked upon as fit for cultivation, for the mountains are not so steep that they cannot be tilled, and few rocks are to be seen. North of this lake, there are some low lands timbered with ash, cedar, bass-wood and birch; these plains are certainly of first quality.

I met with no water-power on the part I surveyed, but on the west side of the du Lièvre river, almost in a direct line with the centre line of the township of Campbell, there is a saw-mill already established, to which the owner proposes to add a grist-mill.

There are already about fifteen settlers established on the banks of the du Lièvre river, in the township of Campbell, and I remarked when making my survey that some are beginning to make clearings.

The only means of communication available for the

settlers are the canoe in summer and a road on the ice in winter, so the opening of a road from the centre line of Campbell to the Red Farm, a distance of about twelve miles, would be of great service, as it would connect with the Chaleur road.

The merchantable timber in this portion comprises hemlock, cedar, bass-wood and birch; there is but little spruce or pin.

F. S. A. PELLETIER, P. L. S. (1889).

The field of my mathematical operations was the river Kiamika, in the county of Ottawa. No stream could have been better chosen as a site for agricultural establishments. Everything there seems to be of a character to invite the hardy settler.

On each side of this river, whose capricious sinuosities are followed at a distance of a quarter or half a mile by the enclosing hills, there extends a zone of rich and level land. Elm, ash and other trees of fine appearance which shade the ground, are the indications of its fertility. The soil is composed of very rich yellow and black earth. Upon the mountains, which would be better styled knolls they are so low, so gentle in slope and so easy of access, are magnificent plateaux covered by a virgin forest of vigorous growth. Birch, maple, spruce, cedar and balsam are the prevailing species; there are also hemlock, ash, bass-wood, beech and iron-wood. The pine has been cut; there is, however, at a few insulated spots, which I have indicated in my notes, some second growth pine which will soon make excellent timber.

The water of the Kiamika is warm, to use the expression of the local explorer, and the country drained by it is temperate. The river, of considerable depth and an aver-

age width of one hundred and thirty feet, is navigable for small craft from Lac aux Ecorces to its source, where there is a fine fall composed of two cascades. The few rapids met with here and there along its course, are of little importance and can all be easily overcome. Three considerable water-powers, two below and near Lac aux Ecorces, and the other already mentioned, at the outlet of the Little Kiamika lake, offer attractive sites for mills or manufactories.

Lac aux Ecorces, Gauvin lake, Little Kiamika lake and Brochu lake are marvellous sheets of water with gay and attractive shores, requiring only the cabin of the settler, the cheerful songs of the Canadians, and the joyous shouts of children to complete the charm.

Fish and game abound throughout.

A. T. GENEST, P. L. S. (1889).

With the exception of the first range which is very hilly, this township is level and most suitable for cultivation. The soil generally consists of excellent yellow and grey loam, according to the report of the three settlers already settled at the south-western end of the township near the Kiamika river. The principal kinds of trees are ash, spruce, alder on the banks of the rivers, cherry; on the high lands are birch, beech, bass-wood and white birch. Pine is very rare.

J. O. LACOURSIERE, P. L. S. (1891).

This survey consisted of the running of the centre line and the front of ranges three and four north-west of the

Kiamika; also the completion of the northern outline, the latter forming the southern outline of the township of Wurtele.

There are a number of settlers in this township, but they are confined to the older subdivision along the rivers du Lièvre and Kiamika.

The portion included in my subdivision is fairly good. the soil being a sandy loam and the timber principally spruce, balsam, tamarac, beech and birch.

The country is generally level and good for farming purposes.

E. J. RAINBOTH, P. L. S. (1900).

Township of Gagnon

This township is above the average for settlement purposes, as regards soil, and the colonization road built through it will no doubt be the means of inducing settlers to locate themselves in it; in fact, several were exploring for that purpose last autumn.

There is still a large quantity of merchantable pine and other timber. Game is very plentiful, and its waters teem with fish.

The first range of the township is very fair, especially the part fronting on Beaver lake; the lower part, that is the portion fronting on White-Fish creek is of a rougher nature. The soil is a light yellow loam and is covered with a heavy growth of white pine, birch, spruce, hemlock and hardwood.

The second range fronting on Beaver lake and creek is rough and rocky and is not of much use for settlement, being very mountainous; the growth of timber is very similar to

that on the first range ; the only level land in this range consists of a spruce and tamarac swamp which runs in a north-south direction, some distance back from the lake.

The third range, fronting on the North Nation river and Long lake is very similar to the second, except that along Long lake some of the lots are not unfit for settlement, but a large portion is high, rocky and hilly, the soil and timber being the same as in previous ranges.

Range IV is high and rolling, the rear being hilly ; the soil is a light yellow loam, a little stony in places and is fairly good for settlement ; there is a heavy growth of timber similar to that on the previous ranges, but with a greater proportion of hardwood.

In range V the land is much the same as in range IV ; along the lake front it is rocky, getting better towards the interior, but is generally hilly, and the rear is rather mountainous ; fifty per cent of this range is fit for settlement ; soil and timber same as on range four.

Range VI. The northerly portion of this range is rather rough and mountainous : towards Simon creek, the surface is more even. The rear part of this range is very good, but along "Simon creek", which runs in an easterly direction and empties into Long lake on lot 33, is to be found the best land in the township : there is a very fine belt of white pine along this creek.

Range VII is generally hilly and mountainous towards the rear ; the land along the lake front is fairly good, especially towards the northerly part, in the vicinity of Simon creek.

Ranges VIII and IX, in the south-west of the township, are very rough and rocky, some very high mountains lying to the west or Devil's lake, notably the Corbeau mountain, the highest in this township : in range VIII all land lying

along Simon creek is fairly good, the surface being comparatively level and, though a little stony in places, is very good for settlement.

There is a good waggon road along this creek, going towards and within about one mile of the north-west corner of the township, which was made and used by Messrs W. C. Edwards and Co. for lumbering purposes ; this road leaves the colonization road below Simon creek, consequently it will be a great service to intending settlers. It crosses Simon creek on a good substantial bridge to the north-east side, where there is a fine tract of land, the finest in the township, extending northwards to the outline of the township, thirty or forty chains in width and uniformly level. The soil is a good yellow loam with a heavy growth of green timber, a large proportion being pine.

The land on the west side of Simon creek and Little Long lake is very rocky and mountainous, this being the nature of the land adjoining the western boundary of this township, which is covered with a heavy growth of mixed timber, common to this locality.

Simon creek is a stream of an average width of about one chain from bank to bank and a large volume of water, especially in the spring ; the lumbermen driving their logs with boats. Only one dam is required on it, at the mouth of Little Long lake. The lumbering operations along this stream are of an extensive character. Messrs. W. C. Edwards & Co are driving this spring some 20,000 logs from Little Long lake and creek, the result of last winter's cut.

They are also driving about the same number on Devil's lake and creek, but this creek being much smaller in size and running through rough country, as it does, is much more difficult to drive on, necessitating the maintenance of a number of dams and slides ; and some years the logs remain in the creek until the following spring.

From the mouth of Simon creek up, say four or five miles, the adjacent land is covered with a large quantity of good white pine, and there must have been at one time an extraordinary growth of pine such as is seldom seen; at present, lots 33, 34, 35, in the sixth and seventh ranges, and 36 and 37, in the seventh range, are very heavily timbered with pine of large size, all of which, I might say, is merchantable.

On the whole, I consider this is a very good township and with its present facilities of access and the market afforded by the lumber-shanties, it ought to settle up rapidly.

E. J. RAINBOTH, P. L. S. (1889).

Township of Gravel

This township is on the north-west side of the du Lièvre river. I surveyed the first range only. This range, as well as the second, are suitable for cultivation.

The land is slightly undulating and consists of grey and yellow sandy loam, with a sub-soil of clayey loam, excellent for cultivation.

The timber is very mixed, among the hard wood trees are birch, maple, ash, elm, beech and poplar. Other trees such as white and red spruce, cedar and balsam fir, are also abundant and of large dimensions.

The survey consisted of the running of range lines, the centre line through ranges two and three and the western outline across the end of range three from the northern outline of the township of Pope, and the re-chaining of the county line which forms the northern outline of this township, across ranges two and three.

This township is, I think, superior to any on the du Lièvre river, for farming purposes ; the country being level, with a light mixed bush, easily cleared and a rich mellow loam varying from sandy to clay in the bottom.

A number of settlers are established from the river back, even beyond the part now subdivided.

No minerals were met with.

E. J. RAINBOTH, P. L. S. (1900).

The township is well adapted for agricultural purposes, the soil being in general rich sandy loam varying in some parts to a clay loam, with boulders and rock scattered over small areas.

A number of settlers are established in the township and form part of a new parish of ninety families, the centre of which is at the "Ferme Neuve" on the du Lièvre river, where a village has sprung into existence within the last two years at the north-east corner of the township of Pope adjoining this township on the south, which contains church, school, blacksmith's shops, stores, hotel and grist and saw mills in close proximity; this village is the present western terminus of the "Gouin Road" being constructed from the Nomingue.

The larger percentage of the timber in the tract surveyed by me is yellow birch and maple, the pine and larger spruce having been nearly all taken off by the lumber firms operating in this locality, but there still remains sufficient of the softer woods, such as spruce, cedar and balsam for the settlers' needs for building and fencing.

The lakes are few and small, a large creek known locally as "Maccollonni creek" flows southwards through the township to the du Lièvre river. No water-powers were observed on this stream. No minerals were met with, the rock outcroppings were few and of a granitic nature.

E. J. RAINBOTH, P. L. S. (1902):

Township of Hincks

Topography.—The best and shortest description of the topographical features of the township of Hincks is to say at once, that it is the roughest township in the Province of Quebec; and, unless in British Columbia, I do not know that so rough a township can be found anywhere else in the Dominion. Not that there are any very high mountains or deep valleys, but such an irregular broken mass of craggy hills or knolls, gullies or mountains from one hundred to five hundred feet high, tossed one upon another, is nowhere else to be seen.

There are, however, indications of phosphate and other minerals, that may yet be advantageously developed.

There are a few good farms along Irish creek, and along St. Mary's lake, and there may be a few good lots along the Gatineau creek; but the best land, in the neighborhood of Great White Fish lake, has been destroyed by the flooding caused by the dam for the mill at the discharge of the lake.

Forest fires have done great damage in this township, particularly in the neighborhood of Little White Fish lake, but in the interior, and along the south-west shore of Great White Fish lake, there seems to be yet a considerable quantity of mixed timber—pine, spruce, birch, maple, bass-wood, etc.

Great White Fish lake is a magnificent sheet of water, dotted with picturesque islands. I am told that soundings have shown a depth of from three hundred to five hundred feet in different parts of it.

Large trout, pike, white-fish, pickerel and bass are taken here in abundance. Trout and pike have been taken as large as from twenty-five to thirty pounds in weight.

In the bay, on lot 35, there is a remarkable cave called "Church Cave". Its mouth is about fifteen feet in diameter and its base is about on the same level as the lake. It extends one hundred and five feet back at right angles to the shore; and about forty feet from its mouth it has a height and width of about twenty feet. The interior is all water-worn white crystalline rock. The least sound made here produces a wild trembling echo.

There are numerous small lakes throughout this region and it appears that those situated in elevated positions where the pike cannot ascend, are well stocked with speckled trout.

H. O'SULLIVAN, I. S. (1889).

Township of Kensington

During the course of this survey I found that a large portion of this part of the township was fit for settlement, notably that part extending from Baie Noire of 31 mile lake and in a northerly direction to Achigan lake, said tract being comprised of range 8 and part of range 9 as far as Achigan lake, north of this lake and extending to the townships of Aumond and Robertson, through the same ranges and also in ranges 10 and 11 in a north-easterly direction to the north-east corner of Kensington. The surface of this tract is undulating and level.

The soil is rich sandy loam with a few scattered boulders.

The Joseph river runs through this northern part, thus giving it an abundant supply of excellent water.

Ranges 10 and 11 from lot 1 as far as lot 44 are generally rough and hilly although there are numerous stretches of undulating land fit for cultivation throughout this tract, the soil being a good sandy loam, though in many places thick with boulders.

There is a large quantity of good timber in the aforesaid ranges, consisting of cedar of good quality, spruce, balsam and a large quantity of medium sized white pine.

There were no minerals found of any value, any rocky formation seen being of granite.

There is a water-power on lot 50 or thereabouts in range 9 on the Joseph river where a saw-mill has been lately erected, the only other power noticed being on lot 43 in the 8th range also on the Joseph river, where there is a rapid of about 250 or 300 feet in length with an approximate fall of eight feet.

There are a few settlers living near the Joseph river in ranges 8 and 9 who have been cultivating their several holdings for a number of years.

A good waggon road has been built as far as range 9 during the past summer season partly by the settlers of this locality, the municipality of the townships of Egan and Kensington, and principally with the funds granted by the Colonization Department. This road, which eventually is to be built to the Lièvre river, (there is a portage or winter road existing already), will be of great advantage to the settling of this district, which has been made acces-

sible by the completing of the railway to Maniwaki, the present terminus of the Gatineau Valley Railway.

There are several large lakes in this part of the township, notably Serpent Lake in range XI and Achigan Lake in ranges 8 and 9. There are a number of small lakes as well which are shown on the plan accompanying this report.

E. J. RAINBOTH, P. L. S. (1904).

In accordance with the instructions issued by your Department, I beg to submit the following report of the renewal of the survey of the 4th, 5th, 6th and 7th ranges of the township of Kensington.

The original lines were visible in many places, especially wherever the bush had not been entirely destroyed by fire or cleared away by settlers.

The lot posts in most cases being burnt or rotted away, a considerable number were found that had escaped the bush fires that have taken place from time to time.

The principal settlement is in the northern part of the township close to the Joseph river, where the soil is of a better quality than elsewhere.

Around and near Lake Bois Franc there are also some settlers with small clearings, The soil in this locality is mostly of a sandy nature and stony.

The interior or portion lying towards the centre line is generally rough land and stony with a large portion of the timber either destroyed by fire or removed by the lumber operations.

Considerable outcroppings of rock were noticed of granite, but no minerals of economic value were found.

Game, such as deer and fur-bearings animals common to this section of the Province, were found throughout this locality.

The lakes of any size are all under fishing lease.

Any lots fit for settlement will no doubt be taken and improved as soon as they are open for location, as the completion of the extension of the Gatineau Valley Railway to Maniwaki, which is adjoining this township, will be a good incentive to settlement in this part of the country.

E. J. RAINBOTH, P. L. S. (1905).

As regards colonization there are several parts of lots suitable for cultivation especially along the Joseph river where some settlers are already established; there is an extensive saw-mill there.

J. O. LACOURSIERE, P. L. S. (1905).

Township of Kiamika

The country is rough and greater part rocky, and the soil a sandy loam. The timber is mixed, hardwood predominating; birch, maple, beech, bass-wood and some iron-wood, also some elm, hemlock and fir; pine and spruce mostly cut away. There is some cedar in low parts. Along the Chapleau road, it is mostly birch and maple of good quality.

J. H. SULLIVAN, P. L. S. (1898).

The surface of this township is in general undulating and the soil consists of sandy clay. The soil is rocky in some places only. The timber is of various kinds but consists chiefly of hard-wood trees. Nearly all the pine has been cut.

The region is one of the best for farming, but the best land is in the 8th range near the Kiamika river. Nevertheless this is not in general as good as west of the Lièvre river which, on that account, is much sought after by settlers.

E. J. RAINBOTH, P. L. S. (1898).

The country comprised in the survey is generally hilly with a sandy loam soil with boulders in places. Some excellent lots are situated in range nine.

The roughest parts are along the vicinity of the Chapeau road range and around lake Pimodan towards the south-east corner. The timber is yellow birch, maple, balsam and spruce.

E. J. RAINBOTH, P. L. S. (1902).

Township of Lytton

I found fourteen settlers in this part of the township who had considerable improvements made and buildings constructed ahead of the survey and located as best they could.

There is a considerable settlement in range six along the front of which a good waggon road exists; this is the road leading to the Tomasine and is largely used by the lumbermen for freighting in supplies.

Part of this country is rough and hilly towards the centre line ; in the southern part the soil is a good sandy loam, the hilly part being sandy with boulders.

A large part of the bush has been burnt and most of the valuable timber has been removed by the lumber firms operating in this locality.

The Desert river, a tributary of the Gatineau, flows southwards through the 6th range and Bras Coupé creek crosses the 7th range in a south-easterly direction to this river.

There is considerable good land along the Desert river still unsubdivided.

E. J. RAINBOTH, P. L. S. (1904).

Township of Major

The survey consisted of the rechainning and posting of the town-line dividing the township of Major from the township of Gravel ; commencing at lot 1 at the townline of Pope and extending northwards for fifty-seven lots of thirteen chains width, excepting lot 57 which is fractional, forming the front of range I.

The surface of the country through the aforementioned ranges is generally undulating, with some hilly ridges run in a westerly direction.

The soil is a rich sandy loam, but in many places boulders are very common, the low-lying land being covered with boulders. The heights are generally covered with hard wood, and offer the most favorable locations for cultivation.

The timber is principally balsam, birch and maple with cedar on the low ground, being mostly unsound, owing to the stony nature of the soil. Spruce in considerable quantity, and large, is found in the southern part. The pine has been nearly all removed by the lumber operations.

There are a number of lakes scattered throughout the tract surveyed, the largest being in the northern part, forming the source of a stream known as "Windigo creek", running towards the Gatineau river and emptying into the Baskatong Lake and river, a tributary of the Gatineau river.

The pine timber taken from here has been floated from these lakes by way of the Windigo creek and Baskatong river, to the Gatineau river.

No minerals of economic value were met with, the rock formation being mostly of a granitic nature, with occasional beds of crystalline limestone.

Fish, such as speckled trout, are found in all large lakes.

Fur bearing animals are plentiful and are beaver, mink, marten and otter.

The south-east corner of the township is within the vicinity of the village of the Ferme Neuve, where are situated a church, school, saw and grist mills, stores, etc., and it is the terminus of the new Gouin road lately constructed by the Department of Colonization.

E. J. RAINBOTH, P. L. S. (1905).

Township of Montigny

This township is situated at an equal distance from the Rouge and Lièvre rivers and is bounded in front by the township of Loranger, to the north by the township of Boyer, to the west by the township of Kiamika, the vacant lands of the Crown and on the south by the vacant lands of the Crown and the township of Lesage.

The land in the township of Montigny is in general broken and rocky, without, however, being unfit for tillage except a portion to the south of the Chapleau road towards the centre of the township and the portion north of the Chapleau road on ranges 5 and 6 which are intersected by gorges and precipitous rocks.

The parts in which the best land occurs are in ranges 1, 2, 3 and 4 north and south of the Chapleau road and ranges 7, 8 and 9 north of the Chapleau road.

All the southern part of the township is arable from the Lesage main line to about 2 miles to the northward and the best way to settle this part would be by passing through the township of Lesage.

In general the soil of this township is composed of a good yellow or gray earth.

The principal timber is spruce, cedar, and hemlock, and on the heights, maple, birch and beech.

There are some very fine sugaries especially on Nos. 46, 47, 48 and 49 of ranges 5 and 6. There is hardly any merchantable timber left, except in the north-western part of the township where the firm of Ross Bros have built camps on No. 11 of the 7th range.

Lakes.—The township of Montigny contains several pretty large lakes, showing on their banks some magnificent sites which make them pleasant to future settlers. Trout,

pike and white-fish abound in them. This township will, no doubt, be sought by foreign sportsmen, both for hunting and fishing, as otter, mink, marten and red deer are very common.

There are also several water-powers, especially on the "Petite Nation" on the discharge of Pius IX lake and on No 42 on the 9th range.

P. A. LANDRY, P. L. S. (1895.)

Topography.—The land through the township is generally rolling and in places rather rough and hilly but there are no high mountains nor deep valleys, and the soil is generally a rich loam, but unfortunately too rocky in most parts to offer much inducement to settlers. It is well wooded with different kinds of timber, birch in particular being very large.

There are also some very fine sugaries on the sides of the hills. There is very little pine remaining and a great part of the spruce has been cut away also, but there is still a large quantity remaining. There are some fine bass-wood trees to be met with and also elm along the streams, with cedar and fir in the low lands.

I rather think it is a pity to see such fine timber being cut down and burnt to clear up such rocky land.

Imagine bush that would yield from forty to eighty cords of wood to the acre, that would sell in most of our towns and cities through the Province, for from three to six dollars a cord, being cut down and burnt to clear land that would not sell for as much per acre, after two or three crops had been taken off it, as one cord of the wood would

be worth in any of our cities. Could not some way be found of preserving this fine wood and timber until some cheaper means be had of transporting it to market?

One has only to drive along the Chapleau road from Labelle, or Nomingue lake to the Lièvre, to see as fine birch as can be had anywhere, that would square from one to two feet.

The rock formation is gneiss and granite, but I have seen some outcroppings of white crystalline limestone on an island in "Lac des Grandes Baies", near the club house, such as we see on the Lièvre and the Gatineau.

Small red deer are very plentiful, so much so that the farmers often shoot them from their houses and barns on moonlight nights and in the early mornings, when they go out of the wood into their grain fields. One man to whom I remarked that it was against the law and a shame to shoot them in the summer answered me that "he called them his sheep and would shoot them whenever he found them in his grain." I don't think he was very particular when shooting them whether they were in his grain or not.

In April last when surveying there we came across some parks and the snow was so deep and heavy that a man on snowshoes could catch them before they could run a hundred yards. I hear there are many hunters who slaughter them at such times or when a thin crust forms on the snow which cuts their legs when they sink through it.

On Lac des Grandes Baies we saw the bones of one that had just been eaten by wolves or wolverines.

In the numerous lakes there are large quantities of speckled trout that are gamy to angle and delicious on the table. I took some splendid ones, with the fly, on Lac des Zouaves.

J. H. SULLIVAN, P. L. S. (1899).

Township of Moreau

The land in this township is generally level, although higher than that of the township of Gravel, the banks of the river being higher on this side than on the other.

The quality of the soil is the same as in the township of Gravel, being a grey and yellow sandy loam, but the clayey sub-soil is very deep. Some places, however, are rocky.

The timber may be classified as in the township of Gravel ; birch, however, is found in larger quantities and is more remarkable for size and quality.

There are still considerable areas of arable land in the vicinity of the townships of Moreau and Gravel, especially on the north-west side of Gravel where the good soil extends to the Gatineau river.

P. T. C. DUMAIS, P. L. S. (1889).

The general features of the country surveyed are undulating and hilly, but not rough as the hills rise gradually, the soil being in general a good rich sandy loam with small and medium sized boulders scattered in some parts over the ground ; part of the 4th range is a good clay loam. A very fine tract of land extends through the 7th range from the southern outline to the centre line. It is along this outline that the "Gouin road" is being constructed ; this road will open up a fine stretch of country suitable for agriculture and will be of the greatest benefit and convenience to the new settlements.

The timber, such as pine and the larger spruce, has been removed, but there is still considerable spruce of value for pulpwood uncut.

There is a quantity of large balsam and some cedar ; the latter is generally unsound, but the hard woods predominate such as yellow birch and maple, the birch being the largest percentage of all kinds.

There are only a few small lakes found in the part surveyed. There are no large water-courses, but there flow towards the Kiamika river two large sized creeks, one crossing the centre line near the front of range five and the other crossing through the 7th range.

No minerals of any value were met with, and the rock formation is of a granite nature.

E. J. RAINBOTH, P. L. S. (1902).

Township of Pope

This survey consisted of running the centre line through ranges 3 and 4, and the lines forming the front of ranges 4 and 5 throughout the full width of the township, also the outline across the north end of ranges 3 and 4.

The country is rather hilly and stony in places, but the soil is a very rich loam, the southern half being better than the northern and continues so westwards towards the rear and is similar in character and quality to the adjoining township of Robertson.

An excellent growth of maple, birch and spruce extends throughout, and the front of the township is all settled and well cleared ; a good road is being constructed up along the river to the township of Gravel.

There are grist and saw mills at the Original falls in the du Lièvre river, about two and a half miles below the south-east corner of this township.

The settlers along the river are well established and find a ready-market for all produce with the lumber camps on the river.

No minerals were met with.

E. J. RAINBOTH, P. L. S. (1900).

This survey consisted of the subdivision into lots of the south halves of ranges 6 and 7 from the centre line to the northern outline of Robertson.

The soil is an excellent quality of rich sandy loam with boulders in many places.

The timber consists principally of birch, maple, balsam, cedar and spruce. There are two lakes situated on Pike creek, which empties into the du Lièvre river just below the "Chute à l'Original".

The front of this township is well settled and cleared and there are also settlers along the lower outline for some miles back of the river.

Game, such as red deer, was plentiful.

No minerals of any value were met with.

E. J. RAINBOTH, P. L. S. (1902).

Township of Rochon

The land generally is undulating, especially near the Kiamika river. There are splendid plateaux south-west of that river in the vicinity of Davis lake which are very suitable for colonization. The trees consist of black birch and other hardwood trees on the heights while in the swamps are balsam fir, cedar, spruce, alder and ash.

J. A. LACOURSIERE, P. L. S. (1891).

Township of Robertson.

Judging by the land over which I passed during the course of my operations, I may assert without hesitation that the portion situate to the south of the centre line is, as a rule, very hilly and rocky. There are, however, fine plateaux especially along the Joseph river, in the vicinity of the Travers lakes, near lake No. I in range VII, and adjoining Lac des Isles. The northern portion is undulating and more suitable for colonization. The timber consists chiefly of black birch, beech, maple, hard-wood on the hills and balsam fir, cedar in large quantities and grey spruce in the low-lying lands.

J. O. LACOURSIERE, P. L. S. (1891).

Township of Villeneuve

The general characteristics of the country are those peculiar to the "Laurentides": the surface rolling and hilly, the soil sandy loam and all more or less stony. The timber consists in a great part of hardwood:—maple, birch, beech, and basswood on the ridges and ash and elm in the valleys, Hardwood very much predominates, the evergreen or coniferous timber being in a much less proportion, the great body of the hardwood extends through the centre of the township from north to south, entering the township at its southern boundary and extending northwards to the south water-shed of the St-Denis creek in the 8th Range and from east to west from the Blanche lakes to the valley of Clay creek lake, with the exception, of a few small belts or ridges of green timber from which the pine has been taken years ago. This is a continuous hardwood section; the only section in which is to be found at present merchantable timber of any account is along the east shore of "Echo" lake particularly in Ranges 5, 6 and 7 and extending about a mile back

from the lake ; a portion of this in ranges 6 and 7 is a very thick pinery which has never been cut. Considerable merchantable timber has been taken out of the same belt of timber in the 8th and 9th ranges and also along the valley of the St-Denis creek. It is also a hardwood country along the eastern parts of the township.

The water-shed is divided between the tributaries of the Du Lièvre river and the Blanche, the Clay creek, and its branches draining the south-western portion, the Blanchard creek the central western portion and the St-Denis creek and branches drain the northern portion with the exception of the north-eastern part which falls away to the Rivière du Sourd, an important tributary of the du Lièvre river, the Blanche river drains the south-eastern portion, one branch extending northwards, the extreme source rising in the 9th range and runs into the north end of "Echo" lake.

The only floatable streams are the Blanche river and the St-Denis creek ; down the latter, logs have been driven about eight miles, several fine mill sites are to be found upon this creek and some very good flats of land for colonization purposes.

Now that the merchantable timber is about exhausted there is but colonization and mining to develop this township, a large proportion of which is arable land and with judiciously laid out roads would not long remain in its virgin state. I would suggest the extension of colonization roads into the township as soon as possible ; there are several good beginnings. A road from the "Ox Bow" on the Du Lièvre, a waggon road made by the lumbermen and now a municipal road as far as the old survey extended up the St-Denis creek could with comparatively small cost be continued eastward across the township and connect with the colonization roads of the prosperous settlements on the Nation in the townships of Hartwell. Ripon and Suffolk which in the probable division of this county on the lines already adopted by the Dominion Government would form

an important channel of communication between the east and west portions of the country of "Lebelle". Another good opening for a colonization road exists by extending what is known as the "Simo" lake road in the township of Portland following the Clay creek ; in fact it is now extended by the settlers themselves into the township and a jumper road has been cut out continuing it to Dam lake on the Blanche, and from the Lièvre side there are many good locations for roads extending into the interior. Nearly if not all the lots on the river front in the old survey are taken up and a good industrious class of people live along the banks of the river enjoying the benefits of civilization to an extent unknown in many other prosperous colonies.

The township is organized and for municipal purposes is joined to the neighbouring township of Bowman ; there is a Post Office "Val des Bois" and a neat commodious Roman Catholic Chapel under the charge of the Revd. W.D. Richer who takes an active interest in Colonization. A steamer daily runs up and down from the High Falls to "Les Pins" falls over 20 miles of uninterrupted navigation and from there connects with the steamer on the lower stretch of 25 miles from the High Falls to Buckingham and forms one of the prettiest routes of travel in Canada.

The mining industry is but little developed but shows that different kinds of minerals are plentiful and among the mining capitalists of the world the township of Villeneuve is as well known in name as some of the famous mines of the world and will undoubtedly sooner or later become the centre of large mining operations.

G. C. RAINBOTH, P. L. S. (1893).

Township of Wabassee

The eastern half of this township having been surveyed many years ago by R. Rauscher, P. L. S., my work consisted of a re-survey of this portion and the completion of the residue extending westward as far as said lake.

There is an old settlement in the part formerly surveyed where the greater part of the land fit for cultivation is taken up, more particularly in the lower part along the du Lièvre river and towards Lac au Foin in the 3rd and 4th ranges, and in the upper part along the river from lot 10 in the 1st range north to the front of range 3 north, along the outlet and around Lac du Camp.

There are a number of lots from No 21 in the 1st range west to 40 in the same range along the river which have considerable areas fit for cultivation. The timber on these lots has been destroyed by fire, but there is a thick growth of small poplar sufficient for firewood growing thereon. The soil is yellow loam mostly free from stones. In the rear these lots are hilly and rocky.

A large portion of ranges I, II and III north has been settled upon and is good land excepting the area covered by lots Nos. 1 to 8 inclusively in the 1st range, No 1 to No 11 in the 2nd range and 1 to No 11 in the 3rd range north. From lot 28 to 35 in the 3rd range north the land is not very good, being broken with hills and rock. In the 1st range west from lot 1 to No 14 all lots are settled upon and improved excepting No 10. The balance of the range is very rough land, high, hilly and broken with gulleys; a very small portion is fit for cultivation. A few lots, Nos 30, 31, 32, 33, 34 and 35, contain a small portion of cultivable land.

In range 3 west from lot 1 to No 10 and part of Nos 11 to 14, the land is fit for cultivation, and several lots in

this tract have been taken up and improved. The soil is a sandy loam free from stones. The balance of this range is similar to range 1 west, being rough and rocky extending to the township of Bouthillier.

In range 4 west the lots from No 1 to 9 are settled upon and improved, the soil being an excellent quality, but this area does not extend further than the rear of the 4th range, being bounded by high rough and rocky hills to the west and north. The residue of the township, consisting of ranges 5 and 6 west is generally rough, hilly land covered with a heavy growth of yellow birch, maple, hemlock, cedar and spruce. It contains occasional small tracts of land fit for cultivation.

In range 5 west from centre line to about lot 14, the land is suitable for settlement and in range 6 west from lot 42 to the north outline as well.

The timber throughout the unsettled part of this township is of a heavy growth.

The principal timber of value is hemlock of which there is a large supply. The remaining timber, excepting some spruce and a considerable quantity of cedar, is yellow birch and maple which have no commercial value in this locality, owing to distance from means of transportation.

No minerals of any consequence were found. The rock formation is of granite nature.

Few lakes are within the township, excepting a few small ponds, the principal lakes are Lac du Camp in the north, two lakes at the head of Babiche creek and Lac au Foin in the southern part.

A large creek called "La Carpe" runs through a very rough portion of the township crossing the town line of Bouthillier and running through ranges 1, 2 and 3 north

to its outlet into the du Lièvre river. Fur-bearing animals were not in any apparent quantity.

Game of all kinds excepting deer very scarce; of the deer there is a large number, but not so numerous as on the east side of the river owing no doubt to the increasing number of wolves which frequent the vicinity of "Thirty-one Mile lake". I may mention the fact of one settler losing a number of sheep and lambs the past season in the Lac au Foin settlement, having been devoured by wolves. We ourselves were frequently disturbed and followed by those noisy denizens of the forest.

E. J. RAINBOTH, P. L. S. (1904).

The northern part of this township is unfit for cultivation, with the exception of the land adjoining Commissioner's lake and Lac du Camp.

J O. LACOURSIERE, P. L. S. (1905).

Township of Wells

Topography.—The soil of the northern portion of this township is, as a rule, well timbered and hilly. It is a succession of heights without order, intersected by ravines and deep gorges, at the bottom of which are small streams.

Most of the hills are difficult of access and their height varies from 200 to 1000 feet.

The southern part is less broken, the hills are lower, the valleys wider and the undulations more regular.

Roads.—A good road for wheeled vehicles runs across the front of this township. There are also two good portage roads, one running across the township from the south-west to the north-west, following the windings of the Rivière du Sourd ; the other, although considered a branch of the other, leaves the front road on lot No 29, runs towards the east and joins the former near the front line of range VII.

Fire.—Some years ago, fire ravaged the valley of the Rivière du Sourd. The area so ravaged comprises a zone of about half a mile in width on each side of the river, but at present that zone is partly covered by a new growth of poplar and white birch.

The whole of range II is also ravaged and the soil completely denuded of vegetable humus.

Soil.—In the valley of the du Sourd river, the soil is of good quality and consists of compact yellow loam on a sub-soil of clay.

In the other parts of the township, the soil is rocky and consists, in a great measure, of yellow and gray loam.

Timber.—Notwithstanding the quantities of merchantable timber removed yearly by the license-holders, there still remains sufficient for lumbering on a large scale, such as spruce, fir, ash and basswood of large dimensions. Pine is becoming scarce but fairly considerable quantities are to be found in some places.

The other kinds are, in the order of their abundance: black birch, maple and beech.

Wherever fire has passed, the new growth consists of poplar, white birch, banksian pine and willow.

Mines.—There is a mine of mica on lot 14 of range III. The owners work it from time to time and the yield is reported to be very satisfactory.

A settler showed me a specimen of graphite ; he assured me he had found a deposit of it within the limits of the township.

Game and fish.—Fur-bearing animals such as otter, mink, marten and bear, are scarce. Wolves are becoming more and more numerous and are very bold. I found traces of beaver in two or three places and one of my assistants found three or four families on a chain of small lakes in range VI. Red deer are abundant in this region but unfortunately, the laws are not observed, and every year a number of offences are committed near Lake Wabassee by parties of hunters coming from no one knows where.

There are but few lakes and these are small but, most of them are well stocked with fish. Some contain pike, but most of them contain red and grey trout of fair size.

Colonization.—Owing to the broken ground in this township, the prospects are not very encouraging as regards colonization, and apart from the valley of the Rivière du Sourd, where appearances are more promising, I venture to say that the township is not suitable for settlement.

LOUIS E. FONTAINE, P. L. S. (1900).

Township of Wurtele

I have the honour to submit the following report on the subdivision survey of the residue of the township of Wurtele, in the county of Ottawa, fronting on the du Lièvre river where it had previously been surveyed and subdivided into lots and where a thriving settlement already exists and no doubt the colonization road being constructed along the north-east outline of the township, will be a means of settling up the part now surveyed, all of which is fit for settlement.

The soil is of a varied nature, in some parts clay loam and in other parts sandy loam, with boulders scattered over some places, but in general the soil is of a good mellow character; the country is mostly undulating, with a few hills intervening.

The road above mentioned, called the "Gouin Road", will be of the greatest benefit in opening up this and the surrounding townships, giving the settlers direct access to the railway at the Nominuingue, which place the railway will reach this year or at latest next year, as it is now actually under construction.

The western terminus of this "Gouin road" for the present is at the new village of the "Ferme Neuve", on the du Lièvre river near the north-west corner of this township, where are situated, a church, school, blacksmith's shops, stores, hotel, saw and grist mills, so that the settler now coming in will have all the conveniences and advantages of the older settlements; not that he will not have difficulties to contend with in clearing a new farm, which means a great deal of hard work; but the class of settler already in proves what a great success can be achieved in a comparatively short time by men of courage and industry.

The pine timber and larger spruce have been removed by the lumber firms operating in this locality, but there still remains a considerable quantity of spruce, balsam, cedar and hemlock and hardwoods such yellow birch and maple suitable for the settlers' needs, the hard woods being mostly on the side towards the township of Moreau and the softer or coniferous woods towards the southern part or the side next the township of Campbell.

Part of this township drains into the Kiamika river and part towards the du Lièvre river.

Game, such as red deer and beaver, were plentiful ; many fresh workings of the latter were observed.

No minerals of any value were met with.

E. J. RAINBOTH, P. L. S. (1902).

Lake Baskatong

(OTTAWA COUNTY)

This is a fine sheet of water stocked with fish of all kinds. East of the lake there is an area of good land, also east of Sand creek to White Beaver lake.

Between Baskatong lake and the Gatineau river, the soil is good but too moist for cultivation.

H. O'SULLIVAN, I. P. (1891).

The Gouin road

In obedience to instructions from your Department, authorizing me to take the bearings of the Gouin road in the county of Ottawa, I have the honor to submit the following report :

I began to take the bearings of the Gouin road from the 20th mile post from the Chapleau road near Nominin-gue station and planted good cedar posts duly marked at every mile along the road to the new farm, a distance of 37 miles and 22 chains.

The first mile post planted near the 20th post of the Chapleau road is marked O. M.

The Gouin road runs alongside the townships of Loran-ger and Montigny and then across the entire townships of Boyer, Rochon, Moreau, and the northern part of the township of Wurtele.

The line of this road, though in rather hilly country, could not have been better chosen in every respect and the Colonization engineer certainly deserves credit for having found so easy and advantageous a way throughout the whole length of the road.

The opening of this great artery of communication will not only be a benefit to the settlers of New Farm as being a shorter way to reach the business centre of Nomin-gue which is at present the terminus of the C. P. R., but will also group a large number of settlers on all the parts fit for cultivation and there are many of these, especially in the townships of Boyer, Rochon, Moreau and Wurtele.

During my last journey through that region I had occasion to observe that some settlers had already realized the advantages offered to them by the Government at that place and they were eagerly choosing lots on which to settle. I have no doubt that many others will follow their example and that before long most of the lots along the whole of the Gouin road will be taken up.

J. O. LACOURSIERE, P. L. S. (1905).

COUNTY OF PONTIAC

Township of Baby

Soil.—The physical character of the part of the township which I surveyed, has more appearance than quality, because the land in general is slightly undulating and any one, who is acquainted with the Temiscamingue country, where land of that appearance is always of first quality, will not fail to be greatly surprised at here finding so little land suited to settlement. The overdone reputation, given to these lands, is probably due to the fact that the aspect alone of the topography of these rocky lands has sufficed to put them on a level with the fine valleys said to be found on the neighborhood. Still, some, who pretend to know the country, state that there are more magnificent valleys of good land further to the east of the survey made in this township and in that of Laverlochère.

In the 1st range from the line between Laverlochère and Baby, the land is good and fine looking as far as the environs of Cameron lake : in the 2nd range, the good land scarcely extends further to the north than lot 22. On the 3rd, it becomes rocky ; at the 13th lot and on the 4th range, there are only 4 or 5 lots suitable to cultivation. In the N. E. part, which is more rocky, there are nevertheless some low spots of 200 to 300 acres and less in extent, where the land is of first quality ; but, as for the remainder I regard it as worthless for settlement purposes.

There may be about 60 lots in all fit for cultivation. Out of this number about 50 are first class especially in the 1st and 2nd ranges where a grey clayey loam predominates.

Timber.—Considerable quantities of merchantable timber have been manufactured on the lands adjoining Cameron lake ; a large number of pine logs have been cut there, judging from the multitude of stumps to be seen on all

sides ; but, owing to the suspension of lumbering in these localities for 14 to 15 years, there can be a quantity of logs still made there, both of good quality pine and white spruce, to supply several lumbering establishments, especially in the 3rd, 4th and 5th ranges.

Apart from the merchantable timber just specified, the other woods are balsam, black spruce and tamarac, white birch, some black birch, aspen, alder and willows.

There is a "brulé" of several hundred acres on the 1st and 2nd ranges on which the willow and the alder predominate over the tamarac, the white birch, and the aspen of a diameter of 4 to 5 inches.

The number of lots surveyed by me in this township is 104, representing a total superficies of 10,533 acres.

P. T. C. DUMAIS, P. L. S. (1889).

Township of Fabre

Topography.—The steep frowning crags that almost continuously border the Quebec shore of Temiscamingue lake, seem at first sight, to forbid the idea or hope of finding any land fit for cultivation in that direction.

Yet, behind those hills and crags, though they extend, more or less, towards the interior, there are found extensive flats of rich farming lands, as good as can be found in any part of the Dominion.

The soil is mostly heavy blue clay, covered with a rich loam or vegetable mould.

In this township there are a good many rocky ridges, that are utterly useless, particularly south of the Lavallée river, but between said river and Young's creek, the greater part of the country is exceedingly rich and it ap-

pears that good flats of land extended eastward several miles beyond the limits of the present survey.

Timber.—The timber of this region is mostly soft wood. There is a fair quantity of spruce, fir, cedar, etc., in the low lands, but the greater part of the pineries have been swept by fire.

There is a splendid mill site on the Lavallée river, where it crosses the III-IV range line.

H. O'SULLIVAN, I. S. (1889).

Soil.—In the southern part of this township where the survey has been repeated, the soil is very suitable for cultivation especially on all the lots of the 3rd range and from lot No 12 to No 23 of the 4th range. The lots from No 12 to the southern line of the township are covered with rock of but little height but there is only very little arable land on them. In the newly surveyed portion there are very fine plateaux whose soil consists of grey and yellow loam in all the ranges north and south with the exception, however, of a portion of Nos. 8, 9 and 10 of the south range where there are many rocks covering a considerable portion of the surveyed land and where the small valleys of good land are of slight importance.

The Young and Lavallée rivers run through this township and in many places supply water-powers that might be utilized for industrial purposes especially on the Lavallée river where a fall about thirty feet high gives a fine water-power on lot No 21 of the 4th range.

Timber.—The timber in this township is of no commercial value properly speaking as it has been almost completely destroyed by fire on several occasions.

In the places where resinous trees are still left, timber was cut by two parties of lumbermen employed by the limit-holders, Messrs J. R. Booth and Andrew White. At present nothing remains but a very little spruce and small sized pine. The remainder of the timber consists of balsam fir, red spruce, white birch and some black birch. The young trees growing in the burnt districts consist of clumps of poplar, willow, white birch, wild-cherry and alder and are of no use whatever.

The number of lots I surveyed in this township is one hundred and thirty-four (134), representing a superficial area of 14,075 acres, not including the 42 lots I surveyed in the 3rd and 4th ranges and the area of which is 4,410 acres, making 18,485 acres in all including the allowance or five per cent for roads.

P. T. C. DUMAIS, P. L. S. (1897).

1. I was obliged to completely run over again the south exterior line from the post and stone boundary on the shore of Lake Temiscamingue to the depth of the 4th range, because I could find no traces of it without beginning to pick it up at that place. It was only at rare intervals that we noticed a few indications which enabled us to follow the line from one end to the other. Starting from the rear line of the 4th range, I prolonged the said line to the east for a distance of 156 chains.

2. I renewed and again cleared the front lines of the 3rd and 4th ranges, the former from the southern exterior line to the post of lots 19 and 20, and the latter from the post of lots Nos 23 and 24, to the southern limit of the township. The latter, that is to say, the rear line of the 4th range from lots Nos 34 and 35 runs south and north

to the exterior lines of the township. Along these old lines, I renewed all the posts, the boundaries and the blazing. In doing the chaining on the rear line of the 4th range, I established ranges 5, 6, 7, 8 and 9 south, and 5, 6, 7 and 8 north with an equal depth of 75 chains each; range 9 north having a depth of 77.60 chains and range 10 south a depth of 67.00 chains.

3. I ran the lines of the ranges north and south respectively for a distance of 11 lots, with the exception, however, of the line between 7 and 8 south, which was only carried out to the eastern limit of lot No 9, as the land is altogether unsuited to tillage.

I prolonged, however, the lines between ranges 7 and 8 and 8 and 9 north to the eastern limit of lot No 13, in order to include in this survey nearly the whole of the good land in that locality.

All the lots on this line have a width of 14 chains. In ranges 7, 8 and 9 north, I was forced to follow the old subdivision, seeing that several settlers have already made pretty large clearings on these lots, which necessitated the running of a line to the depth of the lots which front on the rear line of the 4th range in each of the 7th, 8th and 9th ranges north.

The depth of these last lots being 84 chains, I only gave them a width of 12.50 chains in order to get six lots of equal width with a superficies of 100 acres on each range, except lot No 6, on the 9th range north, which has a width of 15.10 chains and a superficies of 126.84 acres.

Soil.—In the southern part of this township where the surveyed was renewed, the soil is very well suited to tillage, especially on all the lots of the 3rd range, as well as on the lots from No 12 to No 23, in the 4th range. Starting from No 12, to the southern line of the township, the lots are

covered with rocks of no great height and show very little good arable land. In the eastern part, newly surveyed, there are some very fine plateaux of a gray and yellow soil in all the ranges north and south, with the exception, however, of a part of Nos 8, 9 and 10, south range, where there are a good many rocks, covering most of the surveyed ground and where the little valleys of good land are of small importance.

The Young and Lavallée rivers cross the township and offer at several points water-powers which might be easily utilized for industrial purposes, especially on the Lavallée river where a fall of 30 feet gives a splendid water-power on lot No 21 of the 4th range.

Timber.—The timber is practically of no commercial value in this township, which has been almost completely swept by fire on several occasions.

In the spots where the bush is still green, there were two lumbering establishments last winter of the limit owners, Messrs. J. R. Booth and Andrew White. Everything in the shape of merchantable timber was cut away. There remains at present but very little spruce and some small pine. The rest is made up of balsam fir, tamarac, white birch, aspen, and some birch. The young growth in the *brulés* consists of thickets of aspen, willow, white birch, cherry, and alder and is no good for any useful purpose.

The number of lots surveyed by me in this township is one hundred and thirty-four (134), representing a superficies of 14,075 acres, exclusive of the 43 lots which I measured off in the 1st, 3rd and 4th ranges and which represents a superficies of 4,410 acres; making in all 18,485 acres including the 5 per cent allowance for roads.

Posts of the most durable wood that we could procure in the locality, squared and duly marked, were solidly planted in the ground at all the lots and stone boundaries, with evidence beneath, have been laid down at the intersections of all the lines, as well as at the spots shown on the plan accompanying my instructions.

All the lines have been well cleared out and well blazed; alignment blazes have also been made at the places and the desired distances to the south of each lot post, the whole according to the letters of instruction from your Department and as detailed in my field-notes and designated on the plans accompanying the present report.

PAUL T. C. DUMAIS, P. L. S. (1897).

Township of Gendreau

The soil in this township is not as a rule suitable for farming as the land is mostly very broken and hilly and consequently very rocky. The portion most suitable for farming is in the neighborhood of Keepewa lake, where several settlers are already established. Nevertheless, a good portion of the lots I surveyed will be occupied by new settlers before long. Owing to the proximity of those lots to the railway line, many have already begun extensive clearings, which I have indicated on the plan.

The railway company has already cleared land on the north side of Gordon Creek and Rev. Father Gendreau of the Lake Temiscamingue Colonization Society has also cleared land on the south side where he intends to build a church next summer. I have no doubt that we shall see a little village there in a few years.

Mr. A. Lumsden also has made an extensive clearing on lots Nos 21, 22 and 23 of Lake Temiscamingue range, where he harvested a good crop of grain and vegetables last autumn. During the past two years he put up a saw mill and dependencies which cost a pretty good sum. The mill is very useful to the settlers on Temiscamingue lake and Keepewa lake.

There are also several water-powers on the discharge of Beauchene lake and on Gordon creek which may be utilized at slight expense.

PAUL T. C. DUMAIS, P. L. S. (1895).

Township of Gillies (Block A.)

The soil in general is broken and rocky and consequently poorly adapted to cultivation. There is only the northern part of Osborne lake and a few flats on each side of the river, where the firm of "Gillies Bros Limited" has made some clearings, that are composed of yellow sandy loam and that are suited to tillage. That firm has also cleared about 200 acres of land on the western side of said lake, but the soil is so rocky that it is only fit for pasturage.

The fire which swept this region 25 years ago, I am told, only spared of "Block A" the eastern part of Lake Osborne. The trees on it are fir, black and white spruce, cedar and a few pines of inferior quality. Elsewhere the bush is composed of second growth trees : fir, white birch, poplar and banksian pine of small dimensions.

On the east branch of the Coulonge river, at a distance of about half a mile below the mouth of the discharge of Osborne lake ("John Bull" brook) there is a fall of 11 feet on the summit of which "Gillies Bros" have built a

dam which is used for floating logs. The river at this point is only 85 feet broad and, its outflow being small, I do not think that these falls can ever be utilized for any important industry.

J. E. GIRARD, P. L. S. (1902).

Township of Guerin

The geographical position of this township is certainly the most advantageous of the whole Temiscamingue region from the standpoint of the settler. Its south-east corner is barely $4\frac{1}{2}$ miles from the terminus of navigation on Lake Temiscamingue. It is bounded on the south by all the water-powers of the Quinze river, (with the exception of Devil's Falls) ; on the east by Lac des Quinze on which large steamers can navigate for 70 miles; on the north by an immense flat area of first class arable land as far as Lake Abitibi and on the west by the Indian reservation, the most of which has been conceded to white men and where, during the past two years there has been a strong colonization movement headed by Rev. Father Lasniel, superior of the Oblates at North Temiscamingue. On this reservation, a few miles from the township, Mr. Murray, ex-member for Pontiac and who may be called the father of the towns of Pembroke, North Bay and Sudbury, divided up nearly 300 town lots last year. He has not the slightest doubt that all will be sold before long and he spent the winter there with his family. The township is now about 17 miles from New Liskeard, the present terminus of the regular trains on the Temiscamingue and Northern Ontario Railway.

The subdivided portion of this township comprises ranges 1, 2, 3 and 4 and, with the exception of 24 lots bounded

by the Quinze river, contains an area of 25,000 acres. As in the entire Temiscamingue region, the soil is of the best quality for cultivation or is quite uncultivable.

The discharge of Bryson lake runs through the township from North to South as shown on the plan and along its course, either through the steepness of its banks or the sand whereof they consist, leaves a strip from 300 to 400 feet wide on both sides for cultivation.

In the four subdivided ranges, on the first fifteen ranges to the north, of the central line, as far as I can ascertain along the traced lines at two or three places where I had to pass those ranges, I consider that one-fourth the land is unfit for cultivation owing to the stones and some broken ground mentioned in my notes. As regards the remainder of the northern portion that has been subdivided, I can safely affirm that not one-tenth is unfit for cultivation.

In the southern portion of the centre line, on lots 50 to 55 of ranges 3 and 4 and from 55 to 60 in ranges 1 and 2, that is from Klock's road towards the Quinze river, I was unable to examine the soil sufficiently to ascertain the proportion unfit for cultivation owing to rocks and ravines that intersect the line between ranges 3 and 4, but, from trustworthy information obtained, the greater portion is fit for cultivation. Along the front of lots 40 to 44, range 1, and the rear of lots 30 to 43, range 4, there is a loss of about one-fifth. In the remainder of the southern portion the loss cannot be more than one-seventh. Out of the 250 subdivided lots, there is not one of which it can be said that over one-half is unfit for cultivation.

The soil everywhere consists of clay, covered sometimes with yellow, sometimes with grey loam and more frequently with heavy loam. To get an idea of the richness of this soil, one has but to go to the McDougall farm on block A, shown on the plan, where Mr. Klock got a crop of 55 bush-

els of oats to the acre last fall. And yet this farm is in the stony part of the township. Two miles further is the Niggers' farm which yielded as good crops when it was cultivated.

There was much pine in the northern portion of this township on the limits of the Hawkesbury Company; the little that remains will be cut next winter; it is scattered from lots 6 to 20 of ranges 1 and 2.

In the southern portion, covered almost entirely by Mr. Bryson's limits, there is only a little red pine of small dimensions on the subdivided part, being on one-half the lots from 50 to 60 of range 2. The remainder was cut last winter. In the non-divided portion, there is fine pine of good dimensions near the Nigger's farm and along the centre line in ranges 6 and 7, but, in the opinion of all the most competent men, all the wood could easily be removed in one winter and with one shanty. I saw no timber elsewhere, and two men, sent by I know not whom, and who explored the limit during a month, confirmed what I state. According to those two men, and the statement of several agents of companies, who should be competent authorities, the quality of the timber is falling off every year and this has been going on for several years.

Apart from the point, there still remains, especially in the northern portion, some white spruce of good quality and in appreciable quantities. There is plenty of red spruce and small pulp wood in some places; also white birch, but of small dimensions.

I found no fish in the only two lakes I crossed and the Indians told me they never caught any in those lakes.

Throughout the winter, I saw only two tracks of mink, one of otter and three or four lynx tracks. This means that fur-trapping here is entirely ruined. There are still a few

moose ; the few red deer that remained were killed after the rain in January and, unless something is done, the moose will probably be killed next winter.

Having had the advantage of working four years with an official inspector of Government surveys and having, during eighteen years, been entrusted by the Government you now represent with surveys in the four corners of the Province, I consider myself sufficiently qualified to be able to say that this township is the finest and, especially, the most advantageous to the settler, of all those opened by the Government to colonization in the past twenty-two years. As soon as the lots are offered for sale, the truth of what I say will easily be ascertained. There are already twelve families (five of them from the United States), which, through relatives settled at Ville Marie, have placed themselves in communication solely with the view of being notified when the lots will be offered for sale. As regards information about this section, they have already obtained enough. Rev. Father Lasniel told me the other day, that he was getting similar applications nearly every week. Many settlers would have established themselves four or five years ago in Temiscamingue had we had lots available, for it is beyond dispute that this is the finest and most advantageous region for colonization in the whole Province of Quebec. The extraordinary fresh discoveries at Cobalt, the search for mines here also where geologists say there is no doubt that rich deposits of gold and silver will be found, will long have the effect of keeping farm produce very high.

The above reasons and many others lead the people of Temiscamingue to hope that the Government will open the whole township of Guerin to colonization as soon as possible.

T. SIMARD, P. L. S. (1906).

Township of Guignes

Topography.—The greater part of the township of Guignes surveyed by Mr. Dumais, is well adapted for settlement, it being nearly all an excellent clay soil, level and clear of stones.

There are, however, some untillable ridges on the east outline and on the south outline also, particularly from the VI-VII range line westward to the lake.

It appears that a good part of the north-east corner of the township is also very rocky, but finding the work done so well everywhere I went, as shown on the plan, I did not think it necessary to go any further in that direction than the line between the sixth and seventh ranges.

Along the lower part of the Otter Tail river, there are beautiful flats of land timbered with forked-leaf maple elm, ash, balsam, balm of Gilead, etc., but the flood-water remains too long there in the spring to admit of cultivation, except as hay-land.

There were between twenty and thirty thousand saw-logs made on the Otter Tail river last winter.

Forest fires have swept over most of the south-west and centre of this township, and the land is now easily cleared.

I do not know of a more encouraging place for settlers. All sorts of farm produce sell here for double the ordinary Canadian market price; for instance, hay is sold as dear as from thirty to forty dollars per ton, oats 80 cents to \$1.00 per bushel, there not being yet sufficient raised in the vicinity to supply the lumbering establishments of the Upper Ottawa.

H. O'SULLIVAN, I. S. (1889).

Township of Laverlochere

Soil.—The soil and the physical character of this part of the township are pretty variable.

In the southern part, that is to say, from the centre line to the township of Fabre, nearly the whole of the lots are suitable for settlement, though there are some elevations of the ground where there is nothing but sand and rocks, but these are of slight extent and the land lying at the base of these little mountains and rocks is composed of good grey argillaceous earth overlaid on the surface by three or four inches of black loam.

From the centre line, going north, to Otter river, the surface is still more broken and rocky. The rocks are generally small and of little height and between them there are some fine valleys of first class land which will, doubtless, lead to the taking up of all the lots. North of the Otter and the Little Otter rivers, the ground is more level and the soil also of first quality.

The land is covered with standing timber from the centre line to about one mile, more or less, before reaching Otter river. From that point which is the summit of the southern watershed of that stream, the land was completely swept by fire upwards of twenty years ago. The new growth on the heights is composed of aspen, willow, white birch and fir (*sapin*). In the low grounds, willow and alder predominate over the other trees, which are banksian pine aspen, tamarac and *sapin*, with a diameter of 4 to 6 inches only.

In the last part of the survey, the land will be easily cleared, as there are few trunks of trees on the ground, the stumps and their roots being all out of the soil and rotten.

Timber.—There is still a great deal of merchantable pine and white spruce on most of the lots from the centre line to the *brulé*, on the heights of the Otter river, in the

3rd, 4th, 5th, 6th and 7th ranges, chiefly on the two last and the 8th range, where the young white pine has a diameter of from 15 to 20 inches at the stump, which will render them very valuable to the lumber trade in the near future.

If the wooded lots on the 3rd, 4th, 5th and 6th ranges were not under license, they might be sold as woodlands to the settlers who are established on lots completely cleared and swept by fire in Duhamel and Laverlochère. This would be a great advantage to them, because they have no other place whence they can procure the timber necessary for their buildings and even for their fire-wood.

There is also a splendid grove of white pine traversed by the south exterior line of the township and extending chiefly in Fabre, where several thousand large logs could be cut.

Apart from the merchantable timber, just mentioned, the standing bush is composed of the following trees : fir, black spruce, tamarac, white birch, cedar, aspen, banksian-pine, alder and willow. There is a very little birch or ash and, in spots, hazel, mountain ash, ground hemlock and boxwood are met with in great quantities.

As already stated, wherever fire has passed, the new forest is composed of aspen, white birch, banksian pine, spruce, fir, alder and willow and there is no timber of any use to the trade.

The number of lots surveyed by me is 171, representing a total superficies of 18,114 acres, including the 5 per cent deducted on each lot.

PAUL T. C. DUMAIS, P. L. S. (1890).

Soil.—The soil in the three ranges which I surveyed in this township is in general well adapted to tillage; in the southern part it is composed of a grey and yellow clay and comprises all that is still in standing timber, that is to say, from the rear line of the 6th range to lot 16 in the 8th and 9th range and to lot No 23 in the 7th range. On these latter lots to No 25, the soil is composed in great part of a sandy yellow earth and is broken by small mountains on lots Nos 23, 24 and 25, where the ground is barren over an area of 500 to 600 acres.

Timber.—There is very little merchantable timber on the surveyed lots, nearly the whole of the pine and the best of the spruce having been cut off by the limit owners.

In the part which has not yet been swept by fire, the timber is mixed and of small size. It consists of balsam fir, tamarac and white spruce, white birch, aspen, alder, hazel, willow and a few birches.

In the burnt part, there is no merchantable or useful timber. The young growth consists of small thickets of aspen, cherry, white birch, balsam fir and cedar, which are of no value. The wood still standing can only be used as fuel.

The des Quinze road, which traverses this part of the township, is very much frequented, especially in winter. It is the chief artery for transporting the provisions and plant of the lumber merchants from Baie des Pères to the Baie des Quinze, where Messrs. Gillies Brothers & Co., keep a depot and cultivate in fine style a farm of about 130 acres. This road is very useful to the new settlers and the Government would do an act of great justice by spending a few thousand dollars to improve it and put it in a proper condition.

The number of lots surveyed by me in this township is 75, representing a total superficies of 7,855 acres including the 5 per cent allowance for roads.

P. T. C. DUMAIS, P. L. S. (1897).

Township of Nédélec

The land all through the township, judging from the earth turned up by wind falls, appears to be of a very good quality, and as to timber, there is a quantity of tamarac of good size for ties, and a fair lot of good cedar.

Along the Quinze river, and the "Chenal du Diable" anglicized into "Devil's Sny", there is a large quantity of beautiful elm, ash and soft maple, and some oak. The land appears to be of the very best quality, but is flooded during high water in Lake Temiscamingue.

J. H. SULLIVAN, P. L. S. (1895).

Township of Mazenod

Soil.—The soil in this township is variable but where there are no rocks or mountains, it is of first quality. In the northern part, that is to say, from the south line of the township of Fabre to a mile and a half to the south, it is composed of a grayish clay, but at several points rocks and small mountains are met, which render it unfit for tillage.

The southern part which extends to the Kippewa river and to the south-east to the lake of the same name is mostly composed of yellow loam, sand and black mould with a clay subsoil, but in this part again the rock and mountains.

monopolize at least a third of the surface especially in the 6th, 7th and the 8th ranges.

Timber.—The first five ranges of this township have been completely burnt over and contain no merchantable or building timber. There is a certain quantity of dry pine, which is only fit for fuel. Some hundreds of cords are annually cut for the use of the boats which run on Lake Temiscamingue.

The young growth is composed of aspen, willow, cherry, white birch and alder. From the 5th range to Kippewa lake, the timber consists of fir, spruce, white birch, poplar, black birch and alder. On the line between the 6th and 7th ranges, there is a pretty large quantity of white and red pine, which is merchantable. The number of lots surveyed in this township is 116, representing a superficies of 1,347,155 acres, exclusive of the allowance of 5 per cent.

PAUL T. C. DUMAIS, P. L. S. (1897).

DuMont and Squaw Lakes

Du Mont lake.—This is one of the great lakes of the county of Pontiac which may acquire importance in time, as the water of the lake is deep as a rule and very good to drink. It is well stocked with large trout, pike, bass, etc., all good for the table.

The hills I saw in some places on the shore generally slope gradually away from the water; the soil is good loam although there are stones in it of course. The soil in the valley is excellent for farming and, in a great many places, extends far back into the country.

There are sixteen islands in Du Mont lake, some of which are very picturesque, especially the beautiful island of Cimo. It is large and well situated and level enough for farming. When cleared it will make a fine farm. I may add that fire has done no damage on the unsurveyed lands as I found it had caught at one place only and I have been told it was a small matter.

Squaw Lake.—A considerable portion of Squaw lake is situated in the unsurveyed lands in rear of Huddersfield. That lake is well stocked with the choicest fish. At Mr. Johnson's I was given fine trout to eat that had been caught in its waters. The soil around the lake is suitable for farming, being clayey and between that place and Du Mont lake there is an extensive area where settlers could establish themselves very comfortably with their families. There is a highway leading from Johnson's to Coulonge village.

JAMES ROONEY, P. L. S. (1890).

COUNTY OF TERREBONNE

Township of Grandison

Range A.—The land in this range is hilly, rocky and of little value. On the other hand; it is well timbered with mixed hard-wood trees: maple, black birch, beech, also spruce and balsam fir.

T. C. DE LACHEVROTIERE, P. L. S. (1888).

Trembling Mountain Park

The Trembling Mountain Park as surveyed to date consists of two parts. The first is situate in the townships of Marchand, Joly and Grandison in the counties of Terrebonne and Ottawa, and the second part is in the upper region of the Rouge river in the counties of Montcalm and Joliette.

The first part of the Trembling Mountain Park was alone called by that name, but the latter was last year given to a much larger area.

The first part contains the splendid "Trembling Lake" at the foot of the mountain whose name has been given to the whole park, and the height whereof greatly exceeds that of all the mountains in the neighborhood.

The soil is rocky and hilly. There are, nevertheless, some places suitable for tillage as, for instance, to the southwest of Trembling lake, between the latter and Lac Vert; along the Portage from Trembling lake to Lac Clair; along the discharge of Lac à la Grue, etc., but the area of arable land is but small compared to that of the land unfit for cultivation.

The Trembling Mountain Park, that is to say the first part, is very suitable for a park . It contains some forty lakes and is close to the railways. The stations of La Conception, Labelle and St. Jovite are only a few miles from the park.

As the land is generally unfit for cultivation, the park does not take away a large area of land fit for settlement

The timber consists of white and red spruce, black birch, cedar, balsam fir, maple, white birch and pine.

JOSEPH C. MIGNEAULT, P. L. S. (1897).

RIVIERE ROUGE REGION

The region traversed by the line separating the counties of Joliette and Montcalm and in the vicinity of the Rouge river

Topography.—On the plan which I have transmitted to your department and which accompanies this report, two profiles are indicated: the first covers the locality from the starting point of the survey, that is to say, from the northern angle of the township of Nantel running north-east to Lake Masquick or Lac des Baies.

The second comprises the part from Lac des Baies running north-west to the exploration line from the du Lièvre river to the St. Maurice run in 1870 by Mr. Lindsay Russell.

The first of these profiles shows us land generally level and the slopes met with on one side or the other seem easy; the whole presents no serious obstacle to colonization.

I must state, however, that at a short distance, both to the north-west and the south-east, the general aspect of this region is not so favorable. In fact, in the one or the other of those directions, this country is much more broken and further a succession of mountain chains is met, which rise higher towards the north-west and the general trend of whose submits is towards the north-east.

The second profile indicates a mountainous country, intersected by narrow valleys, ravines and deep gorges at the bottom of which flow the rivers and brooks of the region.

In the whole of this territory, the only part that seems to me to be colonizable is that extending from the river Rouge towards the south-east.

Beyond the Rouge river, the mountains become steeper and the ravines deeper and more precipitous.

. In this part, I met no sufficient space for a settlement of any importance.

Fire.—Along the prolongation of the division line between the townships of Lynch and Nantel, a zone embracing the second and half of the third mile, has been swept by fire.

The area thus swept runs north-westward and according to the information which I obtained from certain parties on this subject, this zone, they all agree in saying, crosses the Rouge river and extends as far as the Kiamika river. I was unable to verify this information to a certain extent for, after completing my work, I returned by the Rouge river, when I was enabled to note the same destruction.

Soil.—From the Rouge river running south-east, the soil is of excellent quality, consisting of very dense yellow loam which in many places contains a good deal of clay.

Beyond the Rouge river, the soil is in general rocky and not suitable for tillage. Of course, there are spots here and there where the land is of good quality, being, composed of a yellow loam on a clay bottom but the extent is so small and the character of the ground so rough that their cultivation is impossible.

Where the fire has passed over, the layer of vegetable mould which covered the land has almost completely disappeared and in many places only the bare rock remains.

Timber.—The forest trees in the valley and low lands are the balsam fir, the white birch and the spruce.

Cedar is so rare that in several places I could find none for the posts. Still, there are a few clumps of this wood near the Rouge river.

On the most of the summits, the other trees remarked

are, in the order of their abundance : maple, birch and ash.

Where the fire has passed, the new growth is composed of aspen, banksian pine and willow and there is no timber of any value to the trade.

The merchantable timber, consisting of spruce, a few pines and balsam fir, is met to the south-east of the Rouge river, but beyond the stream, it is of small dimensions and does not exist in sufficient quantity to be worked with profit.

Fish and Game.—The fur-bearing animals noted are otter, mink and musk-rats. I also noted on most of the lakes a good deal of work done by the beavers, but unfortunately I have every reason to believe that the restriction about the hunting of these animals is not respected by the hunters of the locality.

Traces of deer and bear are met with from time to time.

Most of the lakes contain fish. Red and grey trout of good size and pike are taken in them.

L. E. FONTAINE, P. L. S. (1898).

UPPER OTTAWA REGION

Survey of the tributaries of the "Gens de Terre" river, west of the Rapid lakes and of the Awasheameka, continuing westward to Birch lake.

In accordance with instruction from your department I have the honour to inform you that I have surveyed most of the tributaries of the Gens de Terre river, lying west of Rapid and Awasheameka lakes, and thence westward to Birch lake, and I have also continued the survey southward to verify the disconnected portion of the head waters of the river Coulonge.

Moose river.—Starting from the large stone boundary I put up in 1892 near the mouth of the Moose river as the western end of Awasheameka lake, marked A on the plan accompanying my report; which point is at 47° 06' 20" N. latitude, I surveyed Moose river, ascending it to the lake of the same name.

About half a mile from the mouth there is a fall or cascade that with the dam at the head gives a rise of 25 feet.

About a mile above this fall, the river widens out into a sort of lake $\frac{3}{4}$ of a mile in length and from a quarter to half a mile in width.

Thence about a mile of broad river 5 to 6 chains wide. In fact all these bays and expanses may be called Moose lake for the dam at the head of the rapids above described, backs the water up to the head of Moose lake at the point D, a distance of 15 miles.

At the point B on the bay that extends nearly a couple of miles south-westward Messrs. Logue & Cox had a shanty last year making square timber and saw logs.

This country is well timbered all over, but it appears that a good deal of the pine is faulty.

Mr. Cox showed me some trees they had felled, which any one not well posted in wood craft would say at first sight they were sound, but after cutting into them they are found punky and rotten hearted : even the best lumbermen are often deceived.

Of course if there were mills on the spot or if easy access could be had to this region, a great deal of good timber that is now left to rot could be utilized ; but when we consider the awful distance, some seven hundred miles, that this timber has to be driven to the Quebec market, second quality stuff cannot pay.

On the south-east side of the lake, I found the limit line run by Mr. G. Rainboth, P.L.S., between berths 195 and 197 as shown on the plan.

At the point C, I planted a stone monument $3\frac{1}{2}$ feet long with pieces of glass underneath and being camped at this spot, I found by repeated observations the latitude to be $47^{\circ} 02' 24''$ N, and on another point on the south side of the lake I found by the observation of the sun's meridian passage to be in latitude $47^{\circ} 01' 24''$ as shown on the plan.

Moose lake.—The body of Moose lake here is nearly $2\frac{1}{2}$ miles in width and is surrounded by a fine undulating country well timbered with pine, spruce, fir, birch, white birch, tamarac, etc.

From the point D we follow up a small creek for about a mile, passing two small rapids that give a total fall of about six feet, above which we come to a narrow lake about a mile and a half in length, which is the last lake on this chain of the Gens de Terre waters.

At the head of this lake I found the latitude to be $47^{\circ} 05' 46''$ N.

A portage of little over half a mile takes us over the height of land to a lake about two miles in length and half a mile in width that discharges northward into Nichkotea lake.

This lake is 25 feet lower than the last mentioned lake on the Gens de Terre waters.

Lake Nichkotea.—A portage of about 30 chains takes us from this lake into a bay of Nichkotea lake over six miles in length and from a quarter to three quarters of a mile in width and is connected with the main lake by a narrow strait opposite the site of the old abandoned Hudson Bay Company's post.

Turning eastward from there $\frac{3}{4}$ of a mile brings us to the main body of Nichkotea lake about $3\frac{1}{2}$ miles in length and two miles in width.

The country all around this lake, as well as around the bay above mentioned, is fairly well timbered with pine, spruce, banksian pine, fir, birch, etc.

Big Lake.—Going eastward from Nichkotea lake, about three miles, bring us to Big lake, an irregular sheet of water about six miles in length and two in width with large bays that reach inland a mile or two on either side; and bordered by a rolling country well timbered with pine and mixed timber.

From the north-eastern extremity of Big lake, about a mile and a half up stream brings us to Dam lake.

This lake is about on the summit between the Coulonge and the Ottawa waters, and from its eastern end a short portage of twelve chains takes us into a large winding lake nearly ten miles in length and from 5 chains to a mile and a half in width.

The country all around is rocky and rolling and is fairly well timbered with pine, spruce, yellow and white birch, etc.

This lake discharge into the Ottawa and from near the middle a portage or canoe route about two miles in length passing through two small lakes, brings us into a bay of Rapid lake, about $2\frac{1}{4}$ miles south-west on the Gouin farm as from E to F on the accompanying plan.

The country through this stretch is undulating; there are no high hills nor deep valleys; the soil is a sandy loam, generally rocky, and fairly well timbered with pine, spruce, birch, etc.

Rapid lake.—On nearing Rapid lake the country has been overrun by fire and is now grown up with young pine, birch, spruce, etc.

Returning to Nichkotea lake we followed the canoe route leading from there to Grand Lake Victoria post.

Starting from the point G a well beaten portage of 16 chains takes us into a small lake or pond and thence another portage of 33 chains takes us into a bay of Lake Kanimina, Wayawagedjiwok (or moving sand lake). This is a splendid lake measuring about ten miles in length, and from a mile to a mile and a half in width at each end but narrow in the middle.

On the east side the country is rocky and rolling but on the west it is comparatively level and well timbered on both sides with white and red pine, birch, spruce, fir, tamarac, etc.

At the foot of this lake a portage of 30 chains on the right, takes us past a rapid that gives a fall of 6 feet.

Lake Kanikito.—At the foot of this portage begins lake Kanikito-Gamann.

This lake is about three miles in length and about a mile in width at the Kawatose portage. (Kawatose-Kenogoma means lake where the points meet.)

At its northern end a large branch comes in from the south-west from which a canoe route leads out to the Coulonge.

Following down the discharge of this lake about four miles we come to Birch lake.

On this stretch there are two portages, the first on the right about 18 chains in length, passing a rapid that gives a fall of 6 feet, and the second on the left, about half a mile in length, passing a fall and rapids giving ten feet difference of level.

The country on either side is undulating, and fairly well timbered with pine, spruce, tamarac, etc.

Lake Kawatose.—Returning to the Kawatose portage at the point H, a well beaten trail of half a mile on a westerly course, brings us to Lake Kawatose-Kenegama.

This is a most bewildering lake. Following its short line the contour measures seventy-four miles, while there is scarcely any part of it over a mile wide, and its extreme length from head to foot is only twelve miles; but such an incomprehensible make up of islands, points and bays can hardly be found on any other lake of its size in Canada or elsewhere.

At the southern end the land is rocky and broken in places, but towards the north and east there are easy slopes gently rolling north-eastward and the whole country around here is well timbered with pine, birch, spruce, tamarac, cedar, etc.

Following down the discharge of this lake about a mile we come into a bay of Birch lake.

Birch lake.—Birch lake is another puzzling sheet of water, and although it does not contain such a labyrinth of islands and channels as Kawatose, its immense arms stretching out in every direction, make it no less difficult for an ordinary white man to navigate without getting lost once in a while.

The shortest sailing distance from here (the discharge of Kawatose) marked K on the plan, to where it meets the Ottawa and Grand Chief Papate's is $12\frac{1}{2}$ miles and from there to the foot of the lake is $8\frac{1}{2}$ miles more, making a total length of twenty-one miles.

Some of its arms extend inland for five or six miles and one of its islands contains over 150 acres, and there are several other islands from 20 to 100 acres in area.

The country all around is level or gently rolling, and well timbered with pine, spruce, white birch, tamarac, etc.

Some good flats of farming lands may be found through this country.

I completed the survey of this lake and closed on my point at L at the discharge of Lake Kanikito-Gama above mentioned ; I also closed on my survey of 1893 at Grand Chief Papate's and Pierre Thomas' as shown at the points marked M and N on the accompanying plan.

At the point M I found by astronomical observation the latitude to be $47^{\circ} 30' 30''$ N.

The elevation of Birch lake is 990 feet above sea level.

Returning to Nichkotea lake we continued the survey of the Coulonge waters downwards, from where we left off at the H. B. Co's old abandoned post.

From the said old post to Gorman's depot at the mouth of Nine Mile bay, there is only one small rapid giving a fall of two feet.

Part of the country on the north side has been over-run by fire below the old post, but farther down there is plenty of pine and mixed timber on both sides.

Nine Mile bay.—We surveyed Nine Mile bay and found it to be only $7\frac{3}{4}$ miles in depth. The country on both sides is undulating and fairly well timbered with pine, spruce and mixed timber all around.

I found by astronomical observation at Gorman's depot to be 47° 08' 45'' N.

Coulonge river.—Continuing down the Coulonge waters we surveyed the main river and lakes and the bays on each side through that unconnected portion on the plan of Upper Ottawa timber limits through berths Nos 352, 234 and 233 and terminated our survey a little below the mouth of the Kamachigama river shown on the plan.

On this downward stretch I established the latitude at four different points as shown on the plan respectively 47° 08' 50'', 47° 02' 10'' and 46° 58' 05'' N.

The last station is at the terminal point about half a mile below the mouth of the Kamachigama river.

Kamachigama river.—The country on either side of this stretch is rolling and in some places rather hilly.

There are some good flats of land along the river, and even on the heights the soil is good where not too rocky.

There is a fair showing of timber all along, some nice bunches of pine, mixed with spruce, tamarac and different kinds of hardwood.

It being the last day of October, all my men gave a hearty cheer when I decided to pull up stakes and start for home, they having been all steady at work since the begin-

ning of May, they were glad to get once more out into civilization.

The descent of the Coulonge river to its mouth, about 100 miles, was made in three days.

This is a splendid river to come down and a very hard one to go up ; but with such men as my Grand Lake Indians one may go anywhere in a bark canoe.

HENRY O'SULLIVAN, I. S. (1895).

Survey of the Shoshoquon River

AND OF THE TRIBUTARIES OF LAKE *Matchi-Manitou* AND OF OTHER LAKES BEYOND THE HEIGHT OF LAND. (1)

Shoshoquon river.—Starting from a squared tree at the mouth of the Shoshoquon river, I surveyed the said river north-eastward a distance of fifty-nine miles, to the head of Shoshoquon lake as from A to B on the accompanying plan.

The lower part of this river is a large looking stream from 2 to 4 chains in width, with deep water and slow current.

There are several rapids and cascades on this river between its mouth and the lake.

The country along the lower portion is level and fairly well timbered with white birch and spruce, larch, poplar

(1) The country described in the following report is shown on the plan of part of the Hudson Bay slope, scale six miles to an inch published before ; but for the better understanding of the same, the reader is referred to sheet No. 9, of the Upper Ottawa, survey, scale 40 chains to an inch ; which sheet comprises the Anwatan arm of the Ottawa, the Shoshoquon Basin from its mouth to the height of land on the west side with Lake Matchi Manitou and a couple of other lakes whose waters flow toward James' Bay.

and banksian pine, while a few white pines of fair size are also scattered here and there along the river.

The bottom soil is generally a good rich clay but there is in many places a layer of light poor sand overlying it, rendering a great part of country unpromising for agricultural purposes.

As we ascend the river the interior is more uneven and on nearing the lake the country becomes mountainous.

Considerable change in the bed of the river in this part is caused by land-slides and erosions.

The same timber is found all along the upper part of the river, white birch and spruce predominating.

Lake Shoshoquon.—Lake Shoshoquon is an irregular stretch of water five and a half miles in length and from a quarter to half a mile in width.

There are admirable sandy beaches around this lake.

Some fine flats of land on each side of the lake extend here and there for half a mile or so, but the surrounding country is mountainous and is timbered chiefly with white birch and spruce.

We saw lots of red deer tracks on the strand and our guides informed us that moose are found here also.

The beaver has been almost exterminated in this region, but bears are numerous, and the Indians say that they are larger here than on the other tributaries of the Ottawa.

Pike, grey trout, pickerel, white fish and sturgeon are plentiful in all these waters; in fact these fish form the chief article of the natives' food.

Descending the Shoshoquon to the point C, we sur-

veyed up the Neep Menanan, a shallow, crooked stream from one to two chains in width.

The country all along is undiversified in appearance consisting generally of light sandy banks and undulating interior, timbered with white birch, banksian pine, spruce, fir, tamarac, etc.

There are three small falls and one rapid between the mouth of the river and the first lake; distance nine miles.

This lake which is simply an expanse of the river is two miles in length and from five to twenty-five chains in width, and is bordered by high hills, covered with white birch, larch and some odd pine.

Lake Kawee.—About a mile and a half further up we come to Kawee Bowakotee lake, a very pretty sheet of water measuring about six miles in circumference and containing one large and five small islands, all well timebered.

Lake Muzenah.—From this lake a short portage of twelve chains brings us to Lake Muzenah Bugetebhagen measuring two and a half miles in length by about a quarter of a mile in width; and then another portage of twelve chains take us through a small lake and over a portage of a chain to Nemegosis lake or small grey trout lake.

Lake Nemegosis.—This is a splendid sheet of water five miles in length, over half a mile in width containing several beautiful islands and surrounded by a high, rolling country timbered with white birch, spruce, tamarac and some scattering pine.

Continuing northward a short portage of fourteen chains brings us to another lake one mile in length and from half to three quarters of a mile in width. This is the last of this chain of lakes flowing into the Ottawa. A short portage of only three chains takes us from there over the

height of land into a small lake whose waters descend to Hudson's Bay.

This lake is called Kamokotay Wagamashik, measuring a little over a mile in length and discharges from the middle north-westward.

Lake Neinegos.—From a bay at its northern end a portage of fifteen chains bring us to Lake Neinegos an irregular sheet of water about a mile in length and a half a mile in width surrounded by high mountains covered with a fair growth of mixed timber amongst which is a lot of young pine.

At the north end of this there is another small lake and then a portage about a mile and a quarter in length brings us to Lake Matchi Manitou.

Lake Matchi Manitou.—Lake Matchi Manitou or Evil Spirit Lake is a beautiful expanse of water measuring over thirty miles in circumference, bordered on the east and west by rocky mountains, especially on the west side. These mountains are covered with mixed timber including some fair sized pine.

Northward the country extends in a slightly undulating plain of rich looking soil and well timbered.

The name Matchi Manitou originated in the following legend given us by the Indian guides :

Many years ago several Indians in two canoes were chasing a large moose and all at once both the Indians and the moose disappeared. This happened about a quarter of a mile from shore on a calm day.

Since then the Indians are afraid to approach that spot and no inducement can make them go near it.

While surveying the lake the Indians pointed out the spot where the accident happened, but none of them would accompany us there.

We sailed all over the place but could not discover anything unusual, although the Indians assured us that the water is sometimes thrown up in the air, and the mountain near by makes a loud rumbling noise like thunder.

There is some good agricultural land around Matchi Manitou and two Indians whose hunting grounds are in this part have made clearings and put up houses there. They grow good potatoes and turnips, which with an abundance of different kinds of fish, with an odd deer and some wapooses and a few bears they manage to live very comfortably.

Returning to the south-western extremity of Nemegosis lake a portage of 48 chains take us to Kamamagogiwinewatch lake, the head quarters of the Kanimetty Koshkwa a large tributary of the Shoshoquon.

On this portage I noticed some good loamy soil well timbered with cedar, yellow and white birch, etc. This remarkably long named lake is a long narrow stretch of water, rather shallow and contains several small islands.

The country is mountainous all around here and is fairly well covered with mixed timber, birch, spruce, fir, tamarac and some odd pine.

Lake Kamokitchi.—A stretch of river for about half a mile on which is a rapid giving a fall of ten feet brings us to Lake Kamokichi Sinowatch, a narrow stretch of water about four miles in length and a quarter of a mile in width, excepting in the middle where it discharges towards the south; the width is nearly $\frac{3}{4}$ of a mile.

The land on either side is undulating and is chiefly covered with white birch and spruce.

About four and a half miles below this lake we come to the forks.

Following down the main river Kanimetty Koshkwa about 14 miles, on which there are six lakes or expanses, we come to its mouth on the Shoshoquon as shown on the plan. The country all along is similar to that just described: rolling land and mixed timber, white birch, fir, tamarac, etc.

Returning to the forks we followed a chain of lakes and portages that connect the Kanimetty Koshkwa route with the Owatan route.

The distance across is seven miles by the canoe route. The country all through is rough and rolling; the chief timber is white birch, spruce and fir. On the last portage the timber has been all burnt.

Lac Vert.—From the end of the portage we went northward to the end of a small lake where a well beaten path or portage about a mile in length takes us through a light sandy *brulé* to Lake Kaokegamiac or Green lake.

This is a nice sheet of water nearly two miles in length and half a mile in width.

The country around here is high and rolling and is timbered mostly with banksian pine from 6 to 10 inches in diameter.

There is a good canoe route from there to Lake Matchi Manitou but as the country did not seem very inviting we did not follow it any further northward.

Returning to the Kanimetty Koshkwa portage we continued our survey southward through the Anwatan bay a large arm of the Ottawa which has never been shown on any plan of that river.

Anwatan bay—This is a singular bay stretching inland about seven miles and its greatest width not being over a

about seven miles ; its greatest width not being over a chains in width.

On the east side the country is rough and rolling, some of the peaks rising to nearly a thousand feet above the level of the bay.

On the west side it is not so rough, but a great deal of the timber has been destroyed by fire and there is not much of any value now remaining.

From the mouth of this bay on Lake Anwatan we surveyed the Ottawa river downwards about $6\frac{1}{2}$ miles to connect with my former survey of 1893 as shown on the plan.

There are some fine flats of land along this latter stretch and the country is well timbered with white and yellow birch, spruce, fir, tamarac, with some good looking groves of white pine.

Returning to Anwatan lake a portage of half a mile on the right bank takes us to the foot of Birch lake.

The upper part of Birch lake was surveyed by me in 1893 and finding all previous work there so erroneous I completed the survey of it and closed on my former point at Grand Chief Papate's where I found by astronomical observation the latitude to be $47^{\circ} 30' 30''$ N. as shown on the plan.

There are some good pineries on both sides of this lake and the country in general is well timbered with spruce, white birch, larch, fir, etc.

HENRY O'SULLIVAN, I. S. (1895).

Survey of the Kapetagewan and Kamichigama rivers and lakes

..DESCRIPTION OF THE REGION.—SOIL AND TIMBER.

I have the honour to transmit you the following report of survey of the Kapetagewan and Kamachigama rivers and lakes. (1)

Starting from two blazed trees one on each side of the Ottawa river at the mouth of the Kapetagewan, fixed by my survey of 1873, I surveyed the latter river from its mouth to the head of the lake of the same name, a distance of 91 miles.

Kapitajewan river.—For the first 12 miles from its mouth the river flows mostly through a level country timbered with poplar; white birch, spruce, tamarac, fir, etc.

About two miles above its mouth a branch runs south-westward into a bay of Kanikwanika lake as shown on the plan.

We surveyed this bay and the mouth of the said branch on our way up from the Shoshoquon.

It is only in spring and fall that there is sufficient water in this branch for loaded canoes, and on that account we did not survey the whole of it.

On the lower part of this river there are some fine stretches of grassy land and the country in general appears to be well adapted for cultivation.

At 12 miles from the mouth there is a short rapid which we poled up and a mile and a half above this there is a small cascade.

(1) The country described in this report is shown on the map of a section of the slope of Hudson's Bay, published with this report. But, for fuller details, the reader may refer to sheet No. 8 of the map of the Upper Ottawa which includes the country extending from the mouth of the Kapitojewan river northward to near the height of land and eastward to the Wagner line at Lake Bouchette on the Ottawa.

The country is level or gently undulating, and timbered with tamarac, white birch, spruce and some odd pine.

Twenty-two miles from the mouth there is a fall 15 feet high and about five miles further up there are falls and rapids giving 20 feet fall. Above the last mentioned cascade the river is very crooked, the distance from there to the Kamachigama portage in a straight line being only $16\frac{1}{2}$ miles while by following the river the distance is about 31 miles.

The country on each side is comparatively level and fairly well timbered with white birch, tamarac, poplar, fir, spruce and banksian pine.

There is no white or yellow pine in this direction, although the soil is in general sandy.

About four miles above the Kamachigama portage there is a lake two miles in length and at the lower end nearly half a mile in width, but at the upper end it is quite narrow.

Lake Kapitajewan. — From there to its head on Lake Kapitajewan the river may be called one continuous rapid.

The country on either side is rough and mountainous and timbered with spruce, white birch and banksian pine.

Around the lakes at the head of the river the country is rough and broken, and partly overrun by fire.

There is no land nor timber worth speaking of in this direction.

Lake Kamichigama.—Returning to the Kamichigama portage, a short carry of half a mile takes us to a small lake $\frac{3}{4}$ of a mile in length and from there another portage of about $\frac{3}{4}$ of a mile brings us to Lake Kamichigama.

This is a large and beautiful sheet of water measuring about thirty miles in circumference.

The country around here is high and rolling, over-run by fire some years ago, and is now covered with a second growth of white birch, spruce, banksian pine and larch. At the discharge of this lake there is a nice bunch of red pine. This is the first pine we saw on our way down, excepting, of course, banksian pine, which is to be found everywhere along there.

On the discharge of Lake Kamachigama we soon came to another fair-sized lake about 4 miles in length, forming nearly a semi-circle $\frac{3}{4}$ of a mile broad in the middle narrowing to a few chains and widening out again at either end. There is some white pine on the east side of this lake.

Aconcey lake—About a mile and a half below this lake we come to a large expanse called *Aconcey lake* about three miles in length and nearly a mile in width. On the east side of this lake the country is burnt and rolling, but on the west side it is more level and fairly well timbered with spruce and white birch. Thence following down the discharge for about six miles passing a couple of short rapids and several small lakes or expanses, we come to the forks. The greater part of this stretch is old *brulé*, but on the west side of the small lake nearing the forks there is some fair sized white pine.

Having camped at the forks we followed up the right hand branch for about $4\frac{1}{2}$ miles to where it ended or separated into two small streams at the end of a long narrow lake. The country is level all around here; the soil is a mixture of very fine sand,—a sort of quick-sand and clay. The timber is chiefly banksian pine and poplar from 6 to 10 inches diameter.

Here I established the latitude by an observation of the sun at its meridian passage, and found it to be $47^{\circ} 46' 34''$ N. as shown on the plan.

Returning to the forks, we continued the survey of the

Kamachegama river down for about 5 miles to a large expanse, nearly two miles in length and from ten chains to a half a mile in width. The country is level all along and timbered with poplar, tamarac, white birch and spruce.

Lake Bouchette.—Continuing downwards for about a mile through a broad, winding stream with sluggish current, we come to another expanse and lake widening out for more than half a mile on the left, and half a mile further down we enter Lake Bouchette. The country is level or gently rolling all around here, and well timbered with pine, spruce, white birch, fir, etc.

We continued the survey through Lake Bouchette to close on the terminal point of the Wagner line on the left bank of the Ottawa as shown on the plan.

HENRY O'SULLIVAN, I. S. (1895).

Survey and exploration of a portion of the north-western section

The territory surveyed lying north of the Ottawa and east of the Province line at the head of Lake Temiscamingue has an area of about (1,500) fifteen hundred square miles or close on to 1,000,000 of acres, enough to fifteen good sized townships.

The country throughout is level or gently undulating, the soil is a sandy loam with sometimes a subsoil of clay very fertile and highly fit for cultivation and entirely free from stone, the only stones or rocks found are on the shores of some of the larger lakes. The country is well watered and lakes are numerous, some of them large and all well stocked with fish; game is not plentiful, moose however are more numerous than in any other part of the Province, caribou are scarce and so are small deer.

Of the fur-bearing animals such as beaver, otter, mink, marten, lynx, etc., there is not an abundance, the country as been so much hunted over that not many are left and consequently it is not much frequented by Indians.

The growth of timber is large, abundant and thrifty, consisting of spruce, fir, birch, white and red pine, aspen, ash, elm, cedar and alder, placed in order of their relative abundance.

Pine is pretty well distributed over this territory, but more plentifully in some localities than in others ; there is a considerable belt of it on the N. E. side of Kaninokamac or Long lake. There is no doubt that in the near future, steamers will be placed on these lakes as they already have been on lakes Kippewa, Quinze and Winowa or Expanded by lumbermen to forward up their supplies and tow down their timber.

This is a valuable section of the Province having such a large extent of excellent farming land which only requires to be known to become rapidly settled. It is easy of access and in a short time will be still more so, as there is a railway now being constructed which is in operation as far as the "Long Sault" or beyond, and will shortly be carried as far as and beyond the head of the Lake Temiscamingue.

JOHN BIGNELL, P. L. S. (1895).

About the end of April last, I wrote you from Seal Home lake that I had just finished the running of the base line or parallel of Latitude between ranges 5 and 6, and the meridian line between Nos. 12 and 13 southward, and enclosed you a rough plan of the same; and informed you that I was then running the meridian line northward to its inter-

section with the located line of the Transcontinental Railway, and I promised to send you a plan of the same with part of the railway line by first opportunity.

When I got through that work towards the end of May, there was no chance of communication with the outer world,—even the Transcontinental people who used to have their mail once a fortnight, were then six weeks without word from headquarters.

Unusually soft weather in April opened up all the small rivers and streams that form a great part of the make up of canoe routes or winter trails in that region, and left the ice still solid on the lakes, and with the remarkably late cold spring experienced all over northeastern Canada, we were thus held up until the end of May.

You will therefore understand that it was with no small difficulty we managed to have supplies forwarded and keep the work going along our line at that season. The nature of the country was pretty much the same as that mentioned in my last report ;—viz : level or gently rolling clay land thickly covered with spruce and other soft woods, but with a greater proportion of barren, swamp and dry ridges thickly covered with small second growth of spruce and jack pine in the neighborhood of the water-shed.

All the open swamps and burnt patches, where they were any way exposed to the sun were clear, of snow before the end of April ; but in the thickly wooded parts, particularly on the northern slopes, we had to have our snowshoes and sleighs up to the end of May. This involved double work in many places ; and then the flooding of the many broad level clay flats rendered it nearly impossible to travel without wading to the waist in snow water and slush.

However, we pushed the work through, and traversed Spirit Lake on the 17th May, where we intersected the Transcontinental Railway line immediately north on the

lake at twenty miles, twenty-eight chains and fifty-four links from our starting point on the base line as from A to B on the accompanying plan.

The country around there being recently burnt, and likely to be much disturbed during the construction of the railway, I thought it advisable to continue our meridian line far enough north to secure its permanent establishment in a low swampy flat at the end of the twenty miles where I planted a boundary stone, twenty-one inches long marked with a cold chisel—21 M. to South, with glass underneath and a large square post in front duly marked :—22 miles and date 17th May, 1907 to North ;—No. 13 to East ;—21 Miles and H. O'Sullivan to South ;—and No. 12 to West,—with copper plates marked 21 to South and 22 to North firmly nailed thereon.

This boundary stone is shown on the plan as at the point C ; and at the point B we planted another boundary stone, 28 inches long, also marked 12 and 13 with cold chisel, and spruce post 6 inches square duly marked, and pieces of glass underneath to serve as witness,—one chain and four links north of the railway line, and twenty miles twenty-nine chains and fifty-eight links north of our starting point A.

We then proceeded to survey the railway line from there eastward to its intersection with Harricanaw river, which was no easy task at that season, or I may say at any season now ; for since the line has been run, a great part of the country has been overrun by fire ; and in that heavy clay soil so thickly covered with spruce, the roots of the trees spread mostly all over the surface, and the sweeping fires leave them exposed without hold and then the least wind storm uproots them, leaving the woods nearly impassable for miles and miles.

It is a pity that this land could not be taken up and cleared at once now. It certainly would be a paying investment ; for a few men with a yoke of two oxen would not take

long in clearing a farm, and they would readily find a paying market in furnishing supplies to the contractors, miners etc. during the construction of the railway, and the lumbering concerns that must surely follow as soon as access can be had at reasonable cost.

However, between wading and climbing, we got through to the Harricanaw river, and I was agreeably surprised to find that distance was only about four and three quarter miles instead of about nine miles, which should be the distance according to the map, part of the "Carte Regionale" of the Upper Ottawa, which accompanied my instructions. The whole region through which I have been working was last summer and is still flooded with prospectors, and we saw several camps of men earnestly at work, and with apparent buoyant hopes of making fortunes out of the precious metals that no doubt exist there as well in Ontario.

I have collected some specimens, but that will be discussed in a future report. I may however mention here, that almost every one I met asked me where or how they could get the best official map of that part of the Province, and I am sorry to say that the only answer I could give was that we had none.

An up-to-date map of that region is a necessity, and it was my intention as soon as I should have completed the surveys of the lakes and rivers mentioned in my instructions, to traverse and fix astronomical points of some of the principal canoe routes through the Huronian belt which extends as far north as Lake Matagami, and of which we have no knowledge whatever other than my surveys of 1894 and 1899, running north from Grand Lake Victoria, and the interprovincial boundary line run by Mr. Laberge and Mr. Patton in 1905, and continued by the latter gentleman and my brother J. H. O'Sullivan in 1906.

Of course the surveys made by the Transcontinental Railway people and the Geological Survey staff will throw

some additional light on the topography of the country, but even this will be only a comparatively narrow belt as compared with the whole area remaining unexplored and unknown.

With this intention I had written my son, Patrick O'Sullivan, to meet me and help to finish up the work, and report to the Department and ask for further instruction if the same were considered necessary; but in this there was a disappointment at my end.

In working along the shore ice of Harricanaw river, I had a bad fall which nearly resulted in a broken arm and a broken instrument. I feel the effects of the sore arm yet, and the instrument, the best one I had for establishing astronomical points, is "*hors de combat*" and can only be readjusted by the maker. I went to Montreal last Monday to try and have it repaired, but there is no one, either there or in Quebec, that has the necessary equipment to do such work, and I must necessarily go to Troy, N.Y. to have it done.

Another and still more grave reason for my returning home at this season, without being able to complete my work, was that the Transcontinental Railway people who had engaged to furnish me with supplies, were unable to do so, not having enough for themselves at the posts where I wanted them most. A lot of their supplies destined for "caches" 8 and 9, remained on the road last winter, and will have to be brought up in canoes.

I learned however at the Harricanaw, "cache" that the Peter Brown river which I had been instructed to survey, was then impassable for canoes, but there was a party to start in a few days to clean it out and use it for a canoe route to forward supplies to the surveying parties working eastward from there. On this account, I decided to leave that part of the work in abeyance, and Mr. Gendron, the "cache" keeper there, was kind enough to lend us a large boat to re-

turn the Seal Home lake, which we succeeded in reaching partly through open water, and partly by hauling our boat on runners over the ice. Reaching Seal Home "cache", we found that they were still unable to furnish us with the necessary supplies, and the only thing to do was to return by the Kinojevis river, and get supplies elsewhere.

The Kinojevis is a splendid canoe route. We surveyed it on our way down and camped at its intersection with our base line where we planted a large boundary stone well marked with a cold chisel, with glass underneath, and a large post, nine inches square duly inscribed R. 5 and R. 6 with my name and date ;—and from there, we continued the survey of the river downward to connect with my survey of last fall of record in the Department.

On arriving at Messrs. Gillies' depot at Lac des Quinze, on the 10th June, I learned that my son had left there on the 1st June going northward by the Abittibi route to meet me in the neighborhood of our base line. This was the first whisper of news I had from home since the beginning of March.

I sent two men to overtake him and inform him that I was on my way home and would return as soon as I could get my instrument fixed, and I advised him in the mean time to complete the survey of Island lake and adjacent waters that are not correctly shown on our maps. On arriving at the Department, I was informed that my son had been charged with verbal instructions for me to measure and gauge certain water-powers on the Keewagama river.

For this I must get a more definite idea of what is required before returning, and I would further take the liberty of suggesting that I should be authorized to complete the survey and take the levels of Rivière des Quinze, from where Mr. C. E. Gauvin left off northward to the lake,—if Mr. Gauvin is not going there to complete it himself.

There is an unaccountable disparity in the difference of level between Lake Temiscamingue and Lac des Quinze, as given by Mr. Lindsay Russell, P. L. S., and other authorities, particularly the book of altitudes published by my colleague, J. White, F. R. G. S., of the Department of the Interior, and it is necessary that this should be verified before making my final report.

HENRY O'SULLIVAN, I. S. (1907).

Description of the country between the discharge of Trout lake through the Winaweaske, in a north-easterly direction to Grand Lake Victoria and to Bay lake and north-west wardly to the head of the Dumoine river

I have the honour to submit you the following report of survey from the foot of Trout lake through Winaweaske and Old Man Lake, &c., Grand Lake Victoria including the Cawassajewan route to the head of the du Moine river. As shown on the accompanying plan, marked sheet No. 10 of the Upper Ottawa survey. (1)

Starting from the foot of Trout lake at the point marked A, which station was the terminal point of my survey in the autumn of 1893, I continued the survey through Winaweaske, etc., as shown on the plan.

At the point B, I met the line ran by Mr. John McLatchie between limits 187 and 356 and I also found it at different other points, where it cuts this lake and on Old Man lake as laid down on the plan.

(1) For the better understanding of the following report the reader is referred to sheet No. 10 of the Upper Ottawa Survey, scale 40 chains to an inch; which sheet comprises the country from the discharge of Trout lake on the Winaweaske waters, north-eastward of Grand Lake Victoria and Bay lake, and southward to the head waters of the river Dumoine river.

A great part of the country around Lake Winaweaske has been overrun by fire and is now grown up with white birch, poplar, fir, spruce, etc.

Lake Winaweaske.—Lake Winaweaske measures from its head at Mishomis portage to the discharge at the western end, a little over nine miles in length.

Its width on an average is not more than half a mile, but there are three bays on the south and one on the north side that extend from one to two miles inland.

Lake Mishomis.—The portage from here to Old Man (Mishomis) lake is about half a mile in length, through a comparatively, level *brulé* and the lakes at either end are about on the same level

The soil around here is a brownish loam, with grey sand on the heights, and dark vegetable mould in the valleys.

Ledges of gneiss are seen here and there from the lake shore, and some of the flats are paved with boulders ; still some good farming and pasture land may be found around here.

Lake Mishomis or Old Man lake, is a magnificent sheet of water. Its contour measures thirty-six miles.

It contains numerous islands and has two discharges, one flowing into the Ottawa by the Spruce river and the other flowing into Grand lake by the five portages.

On the south-west side about half a mile south of the line between limits 193 and 384 there are narrows and then another lake opens out over a mile in width and $2\frac{1}{2}$ miles in length ; then other narrows and a still larger lake about six miles in length and from half a mile to a mile and a half in width.

I called these two expanses Kokomis or Old Woman

lakes, but they are properly speaking all one lake for there is no difference of level between them.

These extensive bodies of water taken together give a contour of over sixty miles.

The land bordering these lakes is of fair quality. There are no mountains nor deep valleys ; it may be called a rolling plain, generally rocky, but here and there are found some good patches of loamy soil. At the north-west end of the lake towards its discharge into Spruce river the country is all burnt and on the west side this *brulé* extends south ward, to a little beyond the line between limits 188 and 358. In every other direction the country is well covered with pine, spruce, white birch, etc.

At the north-eastern discharge begin the five portages so called from five rapids in succession in a distance of about two miles, that give a total fall of 30 feet.

These rapids may be all run in high water with the exception of one that is choked with drift wood.

Below the five portages begins a long narrow lake, being about eight miles in length and not averaging over a quarter of a mile in width excepting at both ends where it expands to nearly a mile in width.

The country all along this stretch is generally level with rocky ridges here and there covered with pine, spruce, white birch, etc.

There are some spots that have been over-run by fire years ago and are now grown up with young pine, white birch, spruce and fir, and banksian pine on the sandy ridges.

A short distance below the mouth of the Obiskaga river, we crossed the eastern outline of limits 182 and 193 as shown on the plan.

After passing the Moosehorn point, and narrows above it where there is a slight rapid we turn sharply to the right and then large expanses extend both north and south for several miles.

Moose Horn lake.—We called these expanses Moose Horn lake. That on the north extends about three miles, with a bay reaching south-eastward therefrom about two miles in depth.

The country all around is level or gently rolling, and is generally well timbered with pine, spruce, white pine, tamarac, etc.

Continuing down stream south-eastward from the Moose Horn about two miles through a broad kind of river from 10 to 20 chains in width for a mile and a half, we come to a large expanse about a mile in diameter.

Then the river turns sharply to the left and after running about two miles north-eastward in a broad lake like stream between charming pine ridges on either side, it meets the waters of the Cawassajewan in a still larger expanse; in fact the country at first sight appears to be all water around here.

Following down stream still towards the north-east for a little over two miles we come to the Leaf rapid.

This rapid is scarcely perceptible when the water in the Ottawa river is at its highest stage, but in low water it is very rough.

Immediately below the rapids the main body of the river turns to the right and a small channel turns to the left that is only passable for canoes in high water.

This smaller channel is only about ten chains to where it falls into a bay of Grand Lake Victoria.

The main channel, after flowing about a mile towards the south-east, falls into a large bay, which in low water is a separate lake divided from Grand Lake Victoria by the Old Woman rapids, but in high water the rapids disappear entirely and it is all one lake.

The country around here is level or gently rolling; the soil appears to be a good loam and well timbered with pine, spruce, poplar and white birch.

I continued the survey of Grand Lake Victoria to connect my work with my former survey of 1893 at the points B and C, and with Mr. Lindsay Russell's survey of the Ottawa river at the point D as shown on the accompanying plan.

Following down the discharge at C, I found that it met another discharge at E, forming one good large rolling stream flowing northward for about $3\frac{1}{2}$ miles to where it meets the main Ottawa river at the point F.

The country along this discharge is level with good clay soil on both sides, timbered mostly with poplar, white birch and tamarac.

Grand Lake Victoria—The portion of Grand Lake Victoria shown on the plan is bordered by a gentle rolling country well timbered with pine, spruce, white birch, tamarac. etc. The country generally speaking is inclined to be stony, still there are some very inviting flats of arable land, and on the heights here and there are seen some splendid bunches of pine.

Having completed the survey of Grand Lake Victoria, I returned to the point G on the Cawassajewan waters, and surveyed from there southward to the head of the du Moine river, in order to ascertain if it was possible to divert the Ottawa waters in that direction agreeably to my instructions of the 6th December 1892.

Lake Cawassajewan.—The lower Cawassajewan lake properly speaking begins at the head of Leaf rapids and ends at the point H, measuring in length over thirteen miles and in width from half a mile to a mile and a half. At K the waters of the upper lake flow over the Cawassajewan falls, giving a total difference of level of $15\frac{1}{2}$ feet in a distance of 100 feet. The land around the lower lake is rocky and, rolling, but well timbered with pine, spruce white birch, tamarac, etc.

Above the Cawassajewan falls the greater part of the country has been overrun by fire, particularly on the east side, and is now covered with a second growth of white birch, poplar, banksian pine, spruce, etc.

I continued the survey of the Cawassajewan waters south-westward from the falls at K to their source at the point O a distance of $12\frac{1}{2}$ miles, carefully measuring all the bays and expanses of this chain of waters.

There is a little or no difference of level from the head of the falls at K to the point N.

At N, a portage on the east side, about one third of a mile takes us past a long rapid, giving a fall of 16 feet, thence about one mile and a half of smooth water takes us to the foot of the height of land portage at the point P, 40 feet above the level of Grand Lake Victoria and 1000 feet above sea level.

This portage is about half a mile long and its summit, which is about 60 feet higher than the lakes at each of its extremities, is 1,000 feet above sea-level.

Most of the country around here has been over-run by fire and the general aspect is uninviting ; still I noticed some large yellow birch near the summit that escaped the conflagration and which gives promise of a better soil than the surrounding second growth would indicate.

I surveyed Round lake, the source of the du Moine river, and terminated my survey in that direction at the point Q as shown on the plan.

Seeing that it was impossible to divert the Ottawa waters in that direction, the dividing ridge being about 100 feet above the level of Grand Lake Victoria, I returned to the point L and in order to set the question at rest for ever, I traversed the country eastward to ascertain whether or not a lower valley existed between the point L and my survey of 1893 at the point R, on Bay lake.

Starting from the Cawassajewan on a course 110° we portage 30 chains across a summit 40 feet in height to a small lake, tributary of the Cawassajewan and only about ten feet above its level.

We crossed this lake on a due east course about a quarter of a mile and thence going south-eastward we crossed another summit in a distance of half a mile, that attains an elevation of 100 feet above the level of the Cawassajewan waters, and from said summit we fall only 36 feet to a long lake that discharges into Bay lake.

Having completed the survey of Bay lake and connected my work with my survey of 1893, at the point R, we returned to the Cawassajewan by a more southerly route as from S to M but without finding any lower ground; the lowest level of water in that direction is still 35 feet above the Cawassajewan.

The levels over the summits of portages were taken with very reliable aneroid barometers, and the elevations of the falls and rapids were carefully taken with the spirit-level.

Bay lake.—There are some good flats of land around Bay lake and on one of the bays on the south side I saw outcroppings of white crystalline limestone as shown at the point marked T on the plan.

The country is generally well timbered with white and red pine, spruce, birch, etc, but between there and Cawassajewan it is mostly all worthless rocky old *brulé* grown up with small white birch, poplar and banksian pine.

At the Cawassajewan falls I found by astronomical observation the latitude to be 47° 24' 25" north.

This is a beautiful cascade as you will see by the accompanying sketch taken on the spot by my nephew.

In three quarters of an hour, at the foot of these falls I caught with a troll 16 pike and pickerel, that weighed 150 pounds making an average of over 9 pounds each ; one of them weighed over twenty-five pounds.

A splendid water-power may be had here, the fall being 15½ feet, and by placing a dam above the falls 20 feet head may be easily had, and a never failing supply of water may be held in the lakes above.

HENRY O'SULLIVAN, I. S. (1895).

Topographical survey of lakes, rivers and portages in the Upper Ottawa region

At Lac des Quinze, I freighted Mr. Klock's alligator steamboat to take our whole party with five large canoes, camping outfit and supplies to the foot of the Barrière portage on Lonely river.

This is a short, well beaten portage, sixteen chains in length, on the left or east side of the river, overcoming cascades and rapids that give a total fall of ten feet. Here a very fine water-power can be had, by damming the river at the head of the rapids, and raising the water three or four feet, which can be done without causing much land damage. You secure the whole basin from there to the height of land

as a reservoir, including the immense waters of Long lakes, Barrière, Obikaba, and many others of minor note which are all on the same, or nearly the same level.

It is a remarkable country when we think that even now, as Nature has made it, when necessary or when it pays them to do it, the Klock Brothers make their alligator steamer haul herself over the sixteen chain portage above mentioned, and then she has a clear run of about forty miles from there to the Revillon post on the height of land without any obstacle whatever, except when the water gets low on some of the sand bars or where rushy expanses occur here and there along the route. The Hawkesbury Lumber Company have an alligator steamer on Obikaba lake, but they were not using it last summer.

This subject of navigation will be returned to later on ; suffice it to say that we rolled our pork barrels over the portage without even drawing the pickle from them, loaded our five canoes, and pushed on without breaking bulk, until we reached the Revillon post near the height of land, where we camped and selected the supplies wanted for immediate use, and left the rest in charge of the Revillon Company's agent.

The first of the two last portages above mentioned, is only a short jump of less than a quarter of a mile in length, and from there a good well-beaten portage three quarters of a mile in length takes us over the height of land of the Abitibi waters.

We camped on a small island at the south end of Island lake, and next day moved northward with our outfit, and tried to ascend the discharge of Labyrinth lake and thus reach the boundary line with our canoes, but in this we were disappointed. This stream is navigable for loaded canoes during high water, and last year the survey party on the boundary survey took advantage of it early in the season,

when the waters were high ; but when we reached there, the waters were so low after a lengthened drought, that all the small streams were nearly dry.

We pushed on however for about a mile, when we found the river so choked with logs and driftwood, that it was impossible to proceed any further with our canoes. This river is given as being a chain wide on the plan of boundary line survey, by Messrs. Patton and Laberge, and possibly, at high water it may average more than that ; but certainly at the time we were there, it did not measure over half a chain in width.

The banks are rich clay soil, with a heavy growth of timber on either side, and as the banks become eroded, the trees fall across the stream, and as of course those that sink below the water level, seldom or never rot or move, we find at low water hundreds of old trees lying across with their roots stuck in the clay on the one side and their tops buried in the mud on the other side.

Island lake.—The plan of this lake by Lindsay Russell which is the only one I know of, shows part of this lake fairly well, but the greater part of the lake is so different from what is shown on the plan, and of course one part of it was never surveyed at all, that I thought it advisable to make a correct survey of it and the canoe route southward over the height of land, the plan of which will be transmitted with the base line or parallel of latitude which must cut the lake somewhere near its discharge.

Having stored my supplies in the Revillon sheds for the western part of the winter's work, and freighted Messrs. Klock's steamer again to take our whole party and outfit to Lake Expanse, from there we ascended the main Ottawa river as far as the canoe route followed by Mr. Bignell over the height of land into the Harricanaw valley. Here again we were doomed to disappointment, for there was not sufficient water to float an empty canoe. This route can be

used for loaded canoes in high water during spring and fall freshets.

We lost a whole day making a dam near the mouth of this small river where it joins the Ottawa, which backed the water up a couple of miles, and the following day surveyed up that far, but there we had to stop, and there was nothing left for us to do but to carry our supplies and canoes through the nearly impenetrable and trackless forest for several miles, which it was impossible to do with the limited number of hands I had at my disposal.

We therefore discontinued work in that direction, and proceeded to survey the main Ottawa river up stream from where Mr. Bignell left it, to its intersection with the base line between ranges 2 and 3 of block A, run by my brother John O'Sullivan in 1882, as ordered by my instructions and indicated on the plan accompanying the same.

Having carefully surveyed this portion of the Ottawa river, and compared my plotting of the same with the plans I had received from the Department, it was difficult to say exactly where to look for said base line, and I was not certain that I had crossed it until I reached the great bend in the river as shown on the accompanying map.

On my way up I had noticed the mouths of two large rivers, coming into the Ottawa from the east and north that were not shown on any plan that I had seen of the Ottawa river, and the great difference between what I had found in the field and the Ottawa river plans, decided me to continue my survey downwards and reconnoitre these rivers and place them in their true position on the map.

The first we came to is a good sized stream, called Bear creek, coming in from the north side, seven and a half miles below Mr. Bignell's starting point on Dam river, and six miles above the forks or mouth of the Abittibi branch. We surveyed this river northward for about fifteen miles to where it branched off and became no further navigable for

canoes on account of the number of old logs and trees lying across it, and accumulations of drift-wood and debris causing impenetrable jams.

There we left the river and climbed to the summit of a bald-headed mount or craggy hill about 300 feet above the level of the river, where we had a good view of the surrounding country.

Looking northward, two valleys seemed to rise gradually one to the north-east and the other to the north-west covered partly with second growth of poplar, spruce and white birch in the low flats, and banksian pine on the drier knolls. At about eight miles from its mouth, we crossed a railway line running on an astronomical course 309° 00' where it crossed the river : we followed it for over a mile and a half on either side in order to lay it down correctly on our maps.

We then returned to the mouth of the river and continued the survey of the main Ottawa river downwards to a little beyond the discharge of Roger lake.

The discharge of Roger lake is a pretty fair sized river, and as it had never been surveyed and in fact there being no indication of even its mouth on Mr. Russell's plan of the Ottawa river, we surveyed it throughout.

While some of the men were engaged in assorting and trimming our supplies for the long run up stream, and tracking and portaging over the first rapids, I employed the others in making a verification survey of the north shore of Lake Expanse and several islands therein : and also surveyed the Ottawa river upwards, and took the levels of the cascades and rapids, and continued the survey of the river to connect with my station on the line between ranges 2 and 3 of block A above mentioned.

Then starting from my station at the mouth of the Kink-jis-kas-katis river or Abittibi branch, we continued

our survey up that river to Crooked lake, and verified the survey of part of that lake, and by making an exact plotting of my work as I went along, I found that the distance given by Mr. Russell's plan was about $2\frac{1}{4}$ miles too short ; that is to say Crooked lake is out of place on his map about $2\frac{1}{4}$ miles, and it is about $1\frac{1}{4}$ mile too far south-east on the printed map.

We then returned to Crooked lake and continued our survey eastward to Kekeko Sakaigan where we found the line run by Mr. G. Rainboth, P.L.S., between ranges 4 to 5.

I found on the spot by direct solar observation, that this line ran exactly due east and west, and by my plotting of survey of rivers and lakes as shown on the accompanying map, its distance due north of the base line run by my brother John between ranges 2 and 3, is about the exact twenty miles.

On my way to the height of land and Island lake as already described, I perceived that the surveys of lakes Obikoba, Barrière and Opasatika were very defective ; in fact, goodly portions of the latter two had never been surveyed at all ; therefore after completing the survey of Kekeko lake and surveying its main inlet northward, we followed the chain of lakes and portages that leads nearly due south to Barrière lake, as shown on the map.

We carefully surveyed the latter with its numerous bays and islands down to the mouth of the river which forms the canoe route to Opasatica lake, and thence up said river to the lake and completed the survey of its southern end ; the survey of the remainder of this lake up to the Revillon post at the height of land may be made on the ice next winter, as the Hawkesbury Lumbering Co. are to have a winter road from the head of Lake Temiscamingue right through to the height of land.

Topography.—I may say at once that as an agricultural country, the whole area embraced by the present sur-

vey, offers inducements for settlement superior to any tract of equal extent now available in this province on the St. Lawrence slope. I had no idea that the country was so good. Of course I had seen parts of it before, and I may say that I had been all around it, but I never was through it until this season.

I had been through the Keepawa region, and all through the chains of lakes and portages between there and Grand Lake Victoria ; and thence northward over the height of land, and down the Nottaway Basin to James Bay,—returning by Moose Factory and Abittibi: but the general aspect of the St. Lawrence slope anywhere between the Ottawa and the height of land north of Grand Lake Victoria on the canoe route above mentioned, or even eastward from there to the sources of the DuMoine, the Coulonge and the Gatineau, would never lead one to think that there was such an extent of really good agricultural land immediately west of it.

It is true that I had been through a considerable stretch of this country on my way back from Abittibi to Temiscamingue, but after one has spent the whole summer in the woods, and is on his way home canoeing in the last days of October, one is not much disposed to admire the scenery; and particularly in this case when I was only passing through, and having to paddle these large lakes at night, it being often impossible to traverse them in day time if there is much wind on, it is not to be expected that one should under these circumstances have a very good conception, or give anything like a fair description of the country.

It may be rather monotonous to give a detailed description of the country, for it can be nearly all described as a level or gentle rolling, clayey plain, with few of its highest ranges of hills attaining an elevation of more than three or four hundred feet above the level of Lac des Quinze; and

thickly timbered with spruce, poplar, white birch, tamarac and banksian pine.

There is very little white, yellow or red pine to be seen anywhere, except around Expanse lake and the south part of Barrière lake, and most of the large tamarac has been killed by the sawfly; but the younger trees now seem to show that they are free from that deadly pest.

The soil is of excellent quality all over, and generally free from stones, and fairly well drained by numerous small streams that wind through the soft clayey flats in narrow, deep, sluggish channels.

Along the main water courses, the banks are generally low and level, and except among the hilly ranges seldom attain an elevation of ten or fifteen feet above the ordinary water level, and in some places not even half that height.

The country being so level, there are very few water-powers;—there not being more than fifteen feet difference of level between Gillies' depot at the southern extremity of Lac des Quinze, and the Revillon Bros. trading post at the height of land, separated by a distance of over sixty miles on the shortest canoe route between these points.

Water-powers.—As already mentioned above, a fairly good water-power can be had on Lonely river where the natural head is about ten feet and which I think, may be raised to 12 or 14 feet without doing much land damage: and this would materially improve the navigation of the extensive mileage of lakes, rivers and streams between there and the height of land which are all or nearly all on the same level.

Another good water-power can be had on the discharge of Roger lake, where the fall is 35 feet in a distance of about 10 chains, and it may be raised a few feet more and have that large body of water to draw from.

There is a fair sized river nearly a chain in width, coming into the Ottawa from the south-east, right opposite the mouth of the Abittibi branch. We followed it up for about half a mile, and at about 15 chains from its mouth, there is a nice clear fall of about fifteen feet over a granite ledge which might be utilized for a limited water-power.

Apart from these I saw no other water-powers, except those on the main Ottawa river above Expanse lake which are as follows:

Six miles above the lakes, there are cascades and rapids that give a fall of twenty-one feet in about 15 chains, but about a mile below this, there is another small rapid giving about $2\frac{1}{2}$ feet fall, and by damming the river at the narrowest point below, a head of from 25 to 30 feet might be had, and thus incalculably improve the navigation of the main river for about twenty miles above, and its numerous branches that drain the country far inland.

The next water-power is about 5 miles above the mouth of the Abittibi branch, where a head of 16 to 20 feet may be had. Below the cascade, there is a long rapid giving 6 feet fall, then a pitch of 8 feet, and then another stretch of rapids giving 3 feet fall.

On the left bank of the river, just below this cascade, there is a splendid quarry of evenly stratified rock in layers from 6 inches to two feet in thickness, which at first sight looks like limestone, but on closer examination is found to have more of a gneissoid character, between granite and gneiss or mica-slate and gneiss.

About three miles further up, there is another good water-power of about 20 feet head, and by damming the river here, about 30 feet head may be had without doing any land damage for the banks are high, and less than a mile further up, there is another fall of 6 feet. An Approx-

imate gauging of the river here gave the flow to be about 200,000 cubic feet per minute.

Nine miles further up, there is a fall ten feet high, and about a mile further, another one giving 25 feet fall ; —and in this case, like in the one before mentioned, if the river was dammed at the first fall where it is comparatively narrow, the combined height of both falls and the rapids between, might give a workable head of forty feet which, with the flow above mentioned, would give about 15,625 horse-power.

The base line between ranges 2 and 3 crosses the river about a quarter of a mile above this upper fall, and beyond this the river flows calm and smooth as far as I have been on it.

Geology.—The rocks along the Ottawa are chiefly Laurentian gneisses strongly impregnated with mica; particularly along some of the rapids above the Abittibi forks. The mica is seen in clear spots from half an inch to an inch and a half diameter, that shine out like stars in the rocky walls on either side, which gives every reason to hope that larger deposits of this valuable mineral may soon be found in that vicinity.

Going westward from there, the rock exposures were less uniform and outcroppings of slaty rocks were seen, resembling the formation of the promontory of the city of Quebec. Around Crooked Lake and from there westward to Kokoko Sakaigan, many of the rock exposures seemed to resemble the Huronian schists of the Chibougamou region.

North-west of Kokoko Sakaigan, the only elevation that might be called a mountain is seen lying north-east and south-west as shown on the accompanying map. From a base line on the north-west end of the lake, I took angles of elevation and found its highest summit to be 800 feet above the level of the lake. This country appears to me to be

well worthy of the attention of experienced geologists and mineralogists.

The same schists were seen further north than the said mountain where I turned back in latitude 48° 12', and the same outcroppings are seen southward as far as Lac Barrière. Near the north end of the latter lake, there is a remarkable change: the schists and slaty rock give way to solid granite of a reddish grey color. At the head of the lake, the magnetic variation was only 9° 30' west, and a mile and a half further south, I found 16 and 18 west on the granite shores and islands.

At Klock's Douglass Farm on Lac des Quinze, the variation was 9° 00' west, and it increased gradually going east and north until at the last crossing of the Ottawa on the 2nd and 3rd range base line, it was exactly 10° 00' west. It was the same at Island lake, and as far south as the height of land, and except at Lac Barrière, I saw no signs of local attraction worth speaking of.

Development.—As already stated, the greater part of the country under description, is most inviting for settlement; for in richness of soil I do not think it can be surpassed by any part of Canada, and the sections that may not be suitable for cultivation or grazing promise fair to be rich in minerals; and although the alluring pine forests may be wanting, there is an abundance of spruce and other valuable timber, so that it may be said with truth that the the whole country is overflowing with natural riches.

It is a great pity that the energies of some of our apostles of colonization, like the late *curé* Labelle were not exerted in this direction, instead of other parts of the province that would have been better kept as forest reserves. Of course, the difficulty of access was and is still a great drawback to the settlement of this region.

The only access to this country from the head of steam-boat navigation on Lake Temiscamingue, is by Klock's road, 15 miles and 73 chains to Lac des Quinze; and they charge \$12.00 per team or \$1.50 per 100 lbs for transporting men and supplies over this road, and then one must look civil, or they will not do it at all. The only alternative in summer, is to follow the river and portage over the fifteen chutes and rapids, from which the river and lake derive their name, which is not more inviting than the Klock road, bad as it is.

Of course the Klock road is the shortest and most advantageous for any one going in the Abittibi lake direction, but for access to the Expanse lake region and all the country drained by the tributaries of the Ottawa river north of it, the route *via* 'Ville-Marie and Gillies' Depot is preferred. We returned by the latter route, and though the portage is about six miles longer, the road is not quite so bad, and they only charged \$10.00 per team instead of \$12.00 by the Klock road.

It is needless to say that until railway communication is had with Lac des Quinze, it will be up-hill work to try to colonize that country.

The distance measured on the map from the Temiscamingue station on the C. P. Ry. branch line to Gillies' Depot on Lac des Quinze, is only about 65 miles by following the lake shore to Baie des Pères, and thence following the portage road above mentioned; and it is in the interest of the province of Quebec and particularly the cities of Montreal, Three-Rivers and Quebec that that great company's line should be extended at least to Gillies' Depot. From there a railway can be easily built along the easterly shore of Lac des Quinze, to where a good crossing of the Ottawa can be had at the foot of Expanse Lake, where a short, shallow rapid divided in two by a small island can be easily and cheaply bridged.

Once across the Ottawa, it might continue in the same north-easterly direction to tap the Grand Trunk Pacific in the Harricanaw Valley.

This is a line of railway that to my mind must be built sooner or later; and the sooner it can be built to Lac des Quinze, the better for Quebec, if we want to keep pace with the Ontario people, who are pushing their railway far north of New Liskeard, and who may easily stretch an arm eastward and cut the grass from under our feet.

With a railway station anywhere on Lac des Quinze, and the few improvements that I have suggested for the utilization of the water-powers and the navigation of the different lakes, rivers and streams, the early and permanent colonization of the greater part of the area comprising about 2,500 square miles as shown on the accompanying map, and beyond it, would be secured.

Fish and Game.—Pike, pickerel, sturgeon and black bass are found in all these waters. Speckled trout are not found except in the smaller lakes where there are no pike: large grey trout and Maskinongé or "maskalunge" are said to be abundant in all the large lakes.

Ducks and partridges were scarce. The Indians say that all the young partridges perished by a cold week's rain last spring.

There are very few small deer, but caribou, moose, bears, lynx and foxes are plentiful. Some of the river banks were beaten like barn yards with moose tracks.

We met several hunting parties from the United States and Western Canada, and even an European gentleman with his lady were camped on an island in Lac Barrière, in search of the monarch of the woods.

Climate.—We did not notice much difference between the climate there and along the St. Lawrence and Ottawa

Valleys. The first frost we had was on the 15th September, and it was only a slight grey frost that did not injure anything; and on the 23rd of the same month, the mercury dipped a little lower, but after that we had no frost until October: and up to the 12th of latter month, the lowest range of the thermometer was 27 above zero, Fahr. The settlers say that early frosts are more frequent and more injurious at North Temiscamingue than at Lac des Quinze, but this I will not vouch for, on account of the difference of elevation, which, according to the Dictionary of Altitudes published by my worthy colleague, Mr. J. White, F.R. G. S., Geographer of the Department of the Interior, Ottawa, is 252 feet: Lake Temiscamingue being 593 and Lac des Quinze 845 feet above sea level. On Mr. Russell's plan and profile of the Upper Ottawa, the difference of elevation between said two lakes is only 130 feet. I know this is too little but possibly Mr. White's may be too much.

I intend verifying this by taking the exact levels there this winter: but let the difference of level be what it may, one thing I am sure of, is that I saw on Mr. Gillies' farm at Lac des Quinze, some of the finest grain, root crops and vegetables I ever saw in my life. I saw solid heads of cabbage, 20 inches in diameter, and potatoes, turnips, carrots and beets exceedingly large and of superior quality; and even tomatoes of good size and fairly ripe were shown me by Mr. Gillies' agent. This, I think, is the best proof of the favorableness of the climate.

HENRY O'SULLIVAN, I. S. (1906).

**Preliminary survey made in view of the opening of a canal
between Great Lake Victoria, (Upper Ottawa),
and the east branch of the Dumoine
river, county of Pontiac**

I have explored the watershed between the east or Moose Branch of the river Du Moine, and Grand Lake Victoria, on the Ottawa River ; and have carefully taken the levels and horizontal measurements, and the general topography necessary to make a conclusive report on the same.

I crossed over from the south end of Eagle Bay of Grand Lake Victoria to Bay Lake, my first object being to ascertain the possibility of making a canal across the summit between the waters above mentioned.

I was pleased to find that there was hardly any summit to be traversed. Bay Lake which discharges northward into Grand Lake Victoria is only separated from the waters falling into the Du Moine River, by a level swamp ; the dividing ridge being only a sand bank not three feet in height.

A small dam about four feet in height has been built by the Bronson & Weston Lumbering Company, at the discharge of Bay Lake, and a road bed has been made across the summit, with the intention of building a tramway to haul the timber from Bay Lake into the Du Moine waters.

If the said dam was raised two feet higher, it would turn the water the other way, over the road bed abovementioned, and the nature of the soil is such, that if the least opening was made, the water would soon make its own channel and run by the Du Moine, and shorten the driving distance, some three hundred miles.

The distance from this point, by following the Du Moine to its mouth, is only about ninety miles (90 miles) ; while by following the natural course of the waters of Bay Lake into Grand Lake Victoria and thence by the main Ottawa

river the distance to the mouth of the Du Moine river is over 390 miles.

The Bronson & Weston Lumber Company might have saved thousands of dollars by having this canal made on their own account, simply for their operations on Bay Lake.

They have already spent ten times more than the canal would cost in building roads and tramways; and if we take into account the extra expenses of two years driving; the extra cost of hauling, &c., I might say that hundreds of thousands of dollars could have been saved by making the canal.

As they are now working, the timber is first hauled on to Bay Lake during winter; then it must be towed to the head of the lake; then hauled across the summit to Sucker Lake, and before this can be done the water is too low for driving in the Du Moine river; in fact last year they were unable to haul all their cut across the summit, a great portion of their logs had to remain in Bay Lake and can only be hauled to Sucker Lake this summer; therefore it will take three years from the time that the logs were cut until they can be brought to market.

Thus you can understand that by this way of working, only the choicest white pine will pay to be brought to market, and consequently a great deal of good and second quality timber is felled and left there to rot.

If the canal was made all could be driven in one season and then not only the second quality white pine, but the red pine and spruce, &c., of which there is an abundance, could be all brought to market.

Bay Lake is an extensive sheet of water. The portion surveyed by me measures over nine miles in length; and the unsurveyed part, stretching westward from near the lower end, appears to be considerably larger.

By referring to sheet No. 6 of the plans which I transmitted to your department a few days ago, and compared

with the accompanying profile, you will see that the length of this canal would be only 190 chains or $2\frac{3}{8}$ miles.

The figures indicating each section or profile correspond with those on the plan.

The portion of the profile from 1 to 4 or C to B is made on a horizontal scale of 40 chains to an inch, so that it may be used for construction, but to make the other section from B to A on the same horizontal scale the entire profile would be over five feet long ; and the difference of level from 4 to 14 (only 61 feet), is not sufficient to show at a glance the different elevations of the level stretches on a vertical scale of 40 feet to an inch, so I reduced the horizontal scale at will for that section.

Bay Lake.—Starting from Bay lake there is at once at its outlet a cascade and rapids giving a fall of ten feet which, with the dam of 4 feet high above mentioned, gives a difference of level of 14.80 feet.

Then comes a stretch of level water for about twelve chains, and then another cascade and rapids giving 12.15 feet fall.

From there the river flows gently on a northward course widening into bays from 5 to 20 chains in width but narrowing again as it comes to the bend where the portage takes in to Eagle Bay. At this bend it is crossed by P.L.S. McLatchie's line between limits 488 and 518 as shown on the plan.

Thence the river runs eastward for nearly two miles, widening into bays from 15 to 30 chains in width and again narrowing to about 5 chains where it enters a pretty large lake which I partly surveyed.

At the discharge of this lake marked figure 7 on plan and profile, there is a cascade giving 3.19 feet fall. Immediately above that fall, there is another lake about a mile

long by three quarters of a mile wide and, at its discharge, another fall 5.25 feet high.

Here we enter another large lake about 5 miles in length and; by measuring its opposite bays, about four miles in width.

At the discharge of this lake there is a rapid giving 6.45 feet fall, then about 5 chains level and another rapid giving 5.76 feet fall as shown at figure 10 on the plan and profile.

From this down to Grand Lake, a distance of about three miles, there was no ice, and the banks being so flooded, I had to abandon the traverse of the river but continued the levels down to Grand Lake Victoria.

On this unsurveyed stretch I found three small rapids : the first, at figure 11, about one foot fall ; the second, at 12, giving 6.80 feet fall ; and the third, at 13, giving 5.40 feet fall, making a total fall of 61 feet from Bay lake to Grand Lake Victoria.

This difference is comparatively small, considering the distance of over twenty-six miles, but it is still too much to admit of diverting the waters of the main Ottawa river in that direction. As already stated Bay lake can be easily diverted into the Du Moine and from the appearance of the country, I believe that it could be lowered some ten or fifteen feet by the proposed canal without much extra cost ; but even at that the Ottawa or Grand Lake should be raised about fifty feet to insure a flow towards the Du Moine valley.

The idea of raising the Ottawa waters so much as fifty feet is simply out of the question ; for in the first place the banks along the discharges (there are three) of Grand Lake Victoria, cannot admit of raising the water more than twenty feet at most ; and even at that the damage caused by flooding such a large area around the lake would be incalculable.

This settles the question that it is impossible to divert the Ottawa waters into the Du Moine by that valley ; but I am not yet prepared to say that it cannot be done by some of the other branches of the Du Moine.

Looking west-ward from Bay lake the country appears low, and it is my opinion that the middle branch of the Du Moine, draining the Antiquas valley, will be found to be lower than the Moose river valley ; and if that is the case there may be some low passage found that would admit of a canal being made in the direction of the Wasajewan, south westward from the main discharge of Grand Lake Victoria. A difference of level of fifty feet in the summit, would settle the question.

It was impossible for me to explore that region at the time I was there.

There was no ice on the rivers and too much ice on the lakes to admit of going either with or without canoes.

Now would be a very favorable time to complete these explorations ; and I take the liberty to say that the interests at issue are so great, that no stone should be left unturned by the Department to find a passage there, if one exists, and in any case, sufficient measurements should be taken to, once for all, decide, whether it is, or is not practicable.

HENRY O'SULLIVAN, P. L. S. (1893).

UPPER OTTAWA AND GATINEAU REGION

EXPLORATION OF 1892-93—DESCRIPTION OF THE REGION—
LAKES AND RIVERS—LAKE KAKABONGA AND
GRAND LAKE VICTORIA

I have the honour to submit the following report of survey with accompanying plan of the region between the Ottawa and Gatineau rivers in the counties of Ottawa and Pontiac.

Starting from McGee's ferry on the river Desert about half a mile above the Chute Rouge, in the 6th range of the township of Lytton as shown at the point marked A on the accompanying plan, we followed up the main river through Round lake to Lac Desert.

River Desert.—From the said ferry to the mouth of the Queen creek the Desert river winds for the greater part through rich alluvial flats well timbered with soft maple, ash, birch, pine, spruce, etc., but from the Queen creek forks to Round lake there are numerous rapids and the country is rougher and more elevated and a greater quantity of pine is visible on both sides of the river.

Round lake.—Round lake is a fine sheet of water about two miles in length and one and a half miles in width. On the north side it receives the waters of the river Tomasine and on the west side comes in the discharge of Lac Desert.

It was formerly well stocked with several kinds of fish: doré, pike, bass, etc., but the lake has been so fished by parties with nets during the spawning season that fish are scarce there now; nevertheless, I caught some splendid bass, weighing five and six pounds, with both the fly and the troll.

In some lakes bass would not rise to the fly, but in this lake they do, therefore it is worthy of careful protection.

The distance between Round lake and Lac Desert by the river is four miles, but it might all be called one lake for there is no difference of level, and the discharge expands in some places to nearly a quarter of a mile in width.

Lac Désert.—Lac Désert is an irregular expanse of water measuring over seven and a half miles in length and from half a mile to three miles in width. In the middle of this lake opposite the mouth of the Ignace river there is a large island about 20 acres in area on which a man named Griffin has a very fine farm of about 50 acres cleared, on which he raises hay in abundance and all kinds of cereals. A splendid view of the lake and its surroundings is had from this island. It is generally a rolling country with fine hardwood slopes that appear inviting to settlers unless perhaps they might be found rather stoney. Having completed the survey of this lake and some of the roads on either side, I returned to Round lake and followed up the Tomasine river.

Tomasine river.—The first mile of the Tomasine river flows smoothly through comparatively level land with steep banks studded here and there with red pine and, then a succession of small lakes, rapids and expanses for a distance of about three miles bringing us to the foot of Lake Tomasine.

The difference of level between Round lake and Lake Tomasine is about 20 feet.

Lake Tomasine.—Lake Tomasine is a long narrow stretch of water over six miles in length and from ten chains to half a mile in width.

Along the lower end the land is gently rolling; about two and a half miles above the discharge there is a very

steep mountain on the east side and at the north end the country is very mountainous. There is a large timber camp on the west shore of the lake about three miles above the discharge. There has been a great deal of pine cut along this river and lake and there is a considerable lot there yet.

Following up the river which falls into Lake Tomasine about $\frac{3}{4}$ of a mile from its upper end, the discharge of Catfish lakes comes in from the south-west at about three miles from the former lake.

Catfish Lake.—Catfish lake is a splendid sheet of water about two and a half miles in length and from half a mile to three quarters of a mile in width with beautiful sloping hardwood hills all around. This lake literally swarms with large trout, pike, bass, catfish, etc.

Returning to the Tomasine river, we followed it up about five miles from the mouth of the Catfish creek; from there to near the discharge of Windfall lake, a distance of about five miles more, the river is so rough that we had to abandon it, and follow the portage that leads into Rock lake on the east side of the river.

Rock lake.—Rock lake is a fine body of water, clear as crystal, and very deep, but the shores all around have a dismal and barren appearance.

This region was burned over, some twenty years ago, and is now partly covered by a second growth of birch and poplar through which the burnt crags and lone rampikes show out in poverty-stricken contrast. Rock lake and some of the small lakes on the route swarm with speckled trout.

From a bay on the north side of this lake a portage leads northward to a chain of small lakes and thence northward to meet the Tomasine river about a mile below the foot of Windfall lake.

The first portage north of Rock lake is about a mile in length and very rough, but the rest are short and easy. On the whole this is considered the best canoe route to reach the H. B. & Co. Post at the Barrière.

Windfall lake.—Windfall lake is a large irregularly shaped body of water, measuring about seven miles on the canoe routes from its discharge to the inlet coming from the Flambeau lake with large bays on either side. The land around this lake is gently rolling and fairly well timbered with pine, spruce, etc. We took some very large pike, here.

Lake Flambeau.—Following up the right inlet above mentioned a short distance we come to Flambeau lake, the last lake on the Tomasine waters and, from its most northerly end, a canal has been made through which the waters of Lake Antostagan, a large lake of the Gens de Terre system, are made to flow by the Tomasine river.

The level of the Antostagan is about 25 feet above Flambeau lake.

Lake Antostagan.—Lake Antostagan is a very irregularly shaped body of water, measuring in length about nine and a half miles with several re-entrant bays on either side ; it might more fitly be called a group of lakes. At the south end it receives the waters of Island lake, and big and little Pike lakes large bodies of water which will be described with their surroundings in due place.

The limit line between Messrs Logue & Cox and Messrs Gilmore & Hughson crosses about the middle of Antostagan lake. The former firm had three shanties in operation last winter, one on Antostagan, one on Island lake and the other on Lake Awashemeka. Their lumber consisted of square timber and saw logs and I must say that their rollways were worth seeing. The natural discharge of Lake Antostagan is into little Wolf lake, but by erecting a dam there the greater part of its waters were diverted into the Tomasine

river as before mentioned. The height of this dam is only about five feet and the total difference of level between Antostagan and little Wolf lake is only eight feet.

Wolf lakes.—Little Wolf lake is only about a mile and a half in length and is separated from big Wolf lake by a beautiful cascade about fifty feet in length and the total fall about seven feet through a gneiss rock channel.

Big Wolf lake is an immense body of water measuring about 14 miles in length from one to four in width with several large bays on either side and numerous beautiful islands.

There is not so much pine around Wolf lake as around Antostagan, but the country seems far more inviting.

The land is gently undulating in easy slopes all around, and judging by the rich growth of mixed timber on every side I should say that the soil is well worthy of cultivation.

A squatter named Decourcy has a clearing of several acres at the lower end of the lake with a snug cabin and root house, etc. He has been living there several years and he says that all kinds of grain and root crops succeed well there.

Near the lower end of Wolf lake a large stream comes in from the west, the discharge of Awasheameka lake.

The distance by the river to the latter lake is about four miles. The land on either side is well timbered with pine, spruce, tamarac, white birch, etc.

There are five rapids on this river making an aggregate fall of 10 feet between Lake Awasheameka and Wolf lake.

Lake Awasheameka.—Lake Awasheameka is another beautiful sheet of water, measuring from south-east to north west about seven miles. The main body of the lake is about

two miles in diameter but there are large bays on either side giving it a width of over five miles to the extremity of these bays. There are several beautiful islands in this lake and it is well timbered all around with pine, spruce, etc.

The south end of this lake comes to within less than half a mile of Lake Antostagan and they are nearly on the same level.

At a very moderate expense a canal could be cut through a low valley between these lakes and by placing a dam at the discharge of Awasheameka its waters could be turned into Antostagan and thence by the Tomasine and Desert rivers to the Gatineau.

I made a very exact survey of this valley, and took the levels carefully at every chain's length so as to furnish a plan and profile of same when required. All these lakes are well stocked with pike, doré, whitefish, etc, but there are no speckled trout in any of them.

Returning to the discharge of Wolf lake there is a short well cleared portage on the right bank to pass a cascade that appears as if made by an artificial dam. An unbroken level gneiss ledge crosses the very outlet over which the water falls about four feet nearly perpendicularly.

About a mile below this cascade, after passing through bays and expanses, we come to another portage on the right bank about 20 chains in length.

The difference of level from the head to the foot of this rapid is about 18 feet; in high water it can be run in large canoes, but it is too full of boulders to be run at low water.

One of our Indian guides who arrived there a little in advance of me unwisely attempted to run it with my best and most valuably laden canoe.

He was wrecked in the middle of the rapids and narrowly escaped drowning; the canoe was broken into several pieces and most of its contents lost including a new steel Gunter chain with several other necessary implements of the outfit.

About a mile further down we come to another rapid about four chains in length giving a total fall of 6 feet. The portage is on the left bank.

At the foot of this rapid we enter Lac des Rapides.

Rapid lake.—The country here is generally level on the east side, there is lots of pine and on the west mostly birch. The head of Rapid lake is about a mile and a half in length and nearly half a mile in breadth and contains two peninsulas on one of which a man named Dechêne has squatted, but lives chiefly by hunting and fishing.

At the beginning of the narrows about a mile below Dechêne camp a large tributary comes in from the west, which my Indian guides inform me is the discharge of several large lakes.

The most important among them is called Lac des Iles.

From here down to the Gouin farm, a distance of about five miles, Rapid lake is only a large river, but here and there expanses to a width of thirty or forty chains occur.

The Gouin farm, now the property of Messrs Gilmour & Hughson, is nicely situated on a point in the lake and is elevated a little above the general level of the surrounding country. There was formerly a large clearing on the island about a mile south of the farm, but it is all covered now with second growth.

North of the farm the lake has a more majestic appearance, for some five or six miles being from half a mile to nearly a mile in width.

The country here is very level on both sides and the heavy growth of mixed timber would indicate a good soil.

About a mile from the discharge of Rapid lake there is a narrow promontory on the north side extending southward into the lake to within 4 or 5 chains of the opposite shore.

Lake Bras Coupé.—Having completed my arrangements for winter supplies and engaged additional portagers, etc., we returned by the Ignace and completed the survey of lakes Bras Coupé, Kagema, and other small lakes in that direction.

The country along that route is generally undulating and the soil is apparently of good quality if not too strong. The hills are covered with a good growth of hardwood while good groves of pine, spruce and hemlock, are found throughout the valleys and ridges. Messrs Gilmour and Hughson had several shanties there last winter.

Messrs. Logue & Cox took advantage of the same road to forward their supplies to Pike Lake, thence to Island lake and Antostagan lake.

Pike Lake.—Pike lake is an irregularly shaped body of water, measuring about seven miles in length by from a quarter of a mile to two miles in width counting the bays and nooks on either side.

It is fairly well timbered all around and along the road from there to Island lake there are splendid groves of tamarac most suitable for railway ties.

Island lake.—Island lake is an immense body of water measuring nearly twelve miles in length by from half a mile to over two miles in width, and containing numerous large and picturesque islands.

There are some beautiful hardwood slopes around this lake, and the highest hills to be seen around are covered with birch, maple, beech, etc.

There is also a fair showing of pine in many places around the lake.

Crow Lake.—From the large bay on the south-west side I crossed the height of land and surveyed Crow lake and another small lake, both tributaries of Crow river.

The head of Crow river here is about 90 feet above the level of Islands lake. There is a fair lot of pine all through here.

Returning the Island lake and completing the survey of it to its most northern end we continued up the inlet to a beautiful lake nearly round and encased between beautiful hardwood hills.

At the northern extremity of this lake we found an unusually large beaver's cabin that at a distance appeared like a haystack, and apparently containing many inmates.

I make this remark for the reason that large families of beaver are few and far between in that region at present.

Returning to the discharge of Island lake. I surveyed it down to connect with my former work on Pike lake passing through Lac Travers a long narrow lake which discharges into the lower end of Pike lake.

The difference of level between Island lake and Pike lake is about 50 feet, and again there is about the same fall; from Pike lake to Antostagan leaving Island lake to be about 100 feet above the level of Antostagan lake.

Having surveyed the latter lake with the stadia in rough weather in October I thought it advisable to check it over with the chain as I had to pass over it again.

We had no corrections to make.

Bark lake.—Passing from Antostagan, through Wolf lake, thence by a small chain of lakes and portages, we came into Bark lake as shown on the plan.

Bark lake is a most irregularly shaped body of water, in fact it is nothing but a succession of bays and arms stretching out in every direction.

It may be called the continuation of Lake Kakebonka for there is no difference of level.

The dam built at the discharge of Lake Kakebonka backs the water up to the very head of Bark lake, so much so that vast tracts of low tamarac flat lands bordering the lake are flooded and the timber withered by the water.

There is a very considerable quantity of pine all around Bark lake, particularly on the south side.

Lake Poigan.—One bay of the lake stretches northward to within a couple of miles of Big Poigan lake while its opposite bay runs southward to within a few chains of the lake forming the head of the Seize river.

Here the lumber of the whole Kakabonka region might be easily made to float by the valley of the Seize river and avoid the difficult and dangerous run by lakes Traders and Poigan and the Maligne rapids on the Gens de Terre.

I made a careful survey of this valley and took the level at every chain's length so as to furnish plan and profile as well as estimates of cost of same if required.

Descending the valley of the Seize after passing the first lake about two miles in length, we come to a portage on the right bank which takes us past some steep rapids, into Hunter's lake, from whence the river is very rapid for the greater part of its course until we reach the confluence of the Grasshopper creek when we ascend the latter stream to a small lake from the south-east side of which a portage of about half a mile takes us to the Gens de Terre river.

Seize river.—There are old shanties on the Seize river and quite a number of small dams have been made there. I may mention also that the river is full of beautiful speckled

trout as are several others of the small rivers and lakes in that region.

I surveyed the river Gens de Terre from the Grasshopper portage above mentioned down to the Lépine farm and the main roads on either side leading to and from the farm. Here we experienced the severest cold of the winter the thermometer falling down as low as 50o below zero Fahrenheit.

We continued the survey of the Gens de Terre river from the farm down to its mouth on the Gatineau river, whence we returned to the mouth of the Petewagama which we went up as far as the lake of the same name.

Lake Petewagama.—Lake Petewagama is a beautiful sheet of water fourteen miles in length by a quarter of a mile to a mile and a half in width and judging by the abrupt appearance of its shores the greater part of it must be very deep.

The country around here is generally rough and broken and not over well timbered. We surveyed four other good sized lakes lying on the north-east side of Petewagama, and thence surveyed the timber road from the north-west end of Petewagama lake over to the Poigan farm.

Rabbit river.—As already reported to your department this part of the country is poor and worthless, particularly in the region of the Rabbit; it is mostly all old burnt tracts covered with stunted banksian pine.

Following up the road recently made by Messrs Gilmour & Hughson after crossing some small lakes, etc., we come to the Wagner line which here crosses the summit between the Rabbit river and Trout river basins.

After crossing the summit we noticed a decided change in the appearance of the country.

Lake Kenocheosanan.—Lake Kenocheosanan (meaning where the Pike spawn) and Kuchikokinagog have already been described in a former report. The land around the former lake is generally rolling and well timbered with pine while the latter is more inviting as agricultural country; fine easy slopes and gently rising hardwood hills meet the eye on nearly every side.

These lakes discharge by the Trout river into Lac Travers, above the Poigan lakes, on the Gens de Terre river.

Following up the Trout river from the discharge of lake Kuchikokinagog, after passing through several small lakes and expanses in a distance of about 15 miles we come to a large and heretofore unknown lake about 12 miles long and from half a mile to a mile and a half in width, to which I took the liberty of giving my own name, viz: "Lake O'Sullivan" having discovered it on St. Patrick's day. The land all along here seems to be of good quality, large white birch, poplar, cherry, hazel, etc., indicating a rich soil.

There is little or no pine in this direction. Following up the inlet of this lake we soon come to a small lake lying at right angles to the general course of the river and from the north-west end of which a short portage of six chains takes us into the head of Bear's Grease river, a good canoe stream to reach the Ottawa.

Following up the Trout river from the last mentioned lake, a distance of about five miles through rapids, small lakes and expanses, we come to Big Trout lake, a magnificent sheet of water, the main body of which is from two or four miles in diameter with several large bays, one of which measures about four miles in length.

Here the Hudson's Bay Company had formerly a trading post at the spot shown on the plan.

Trout lake.—It appears that this is one of the best lakes for trout fishing in the Province. One of the officers

of the H. B. Co. who spent a couple of years here, told me that the lake actually swarms with all kinds of trout.

Two portages lead out from this lake to the Ottawa river, one going northward from the big bay, north of the H. B. Co. post and the other from the north-east end of the lake. At the end of March there was only 2 feet of snow here.

We followed the latter portage which takes us through a couple of small lakes, the actual length of the portage between the Trout river and the Ottawa waters being only thirty chains.

The highest summit of the portage is only forty feet above the level of the Ottawa and the Ottawa is ten feet lower than Trout lake.

The country around here has a very poor aspect; we followed up the Ottawa river about two miles; the river here is like a long marshy lake; the whole country on the north side of it has been burnt some two or three years ago.

Finding the country so poor and worthless, I abandoned the survey in that direction, squared a spruce tree, on which I marked my name and the date with a marking iron, and continued the survey downwards.

Arriving at the mouth of Bear's Grease river I surveyed it to its source and connected with my work on the Trout river.

This is the route generally followed by the H. B. Coy, between Lac Barrière and Trout lake depot. They pass through Burnt Lake to avoid the long and difficult rapids of the Ottawa.

Burnt lake.—The country around Burnt lake is worthless, having been burned over and it is now covered with a young growth of banksian pine.

About 5 miles below the Burnt lake portage we come to a lake nearly a mile in diameter through a corner of which the Ottawa river passes. At the north-east corner of this lake a river that appears fully as large if not larger than the main river I had been following, comes in from the north; my Indian guides say there are a number of large lakes on this river.

From this down the main river acquires much larger proportions and the country has a better aspect.

About 4 miles further down we come to another lake or expanse, in fact there seem to be bays in every direction, and in one of those bays, as shown on the plan, another larger river comes in from the north.

Still following down the main river through bays and expanses, mid level banks covered with banksian pine for a distance of some 4 miles more, we come to the head of a large island.

We followed the left channel which at the upper end appears to be as large as the right hand channel, but, on following it down, we soon found that it was very small.

I should say that, except in high floods, nine tenths of the water passes through the right hand channel.

Perch river.—About 8 miles below the head of the (channel) island, a large stream called Perch river comes in from the east, and about three miles further we come to Lake Kawishte, a pretty large lake studded with islands.

Lake Kawishte—The combined waters of the east channel and Perch river fall into Lake Kawishte, and run northward to meet the main channel of the Ottawa about two miles beyond the lake.

We followed the short cut portage through a chain of small lakes that head out to the Ottawa a little above the Wagner line.

About a mile and a half below the Wagner line, another portage takes us through a burnt country covered with banksian pine to the head of Lac Barrière as shown on the plan. On either side, whether following the portages or the main river, we saw very little land or timber worth speaking of.

There are in the Ottawa river from where we struck it at the head of Trout lake, to Lake Barrière, fifteen rapids and cascades giving a total difference of level of about 200 feet ; there are no falls.

I measured the sectional area of the river at the first open water below Trout lake portage, and found it to be 40 feet wide by a mean depth of 18 inches giving a sectional area of 60 feet with a velocity of 5 feet per second, and this volume is increased more than tenfold before we reach the Wagner line. If ever it were necessary to increase the flow of water in the Ottawa the large lakes at the head of Trout river might easily be diverted into it by the valley of the Bear's Grease river.

Lake Kakabonga.—Through a narrow channel from Bark lake we come into Kakabonka, the largest and finest body of water in the whole region enclosed by the Ottawa and Gatineau waters.

This lake is about twenty-five miles in length and six in width in its broadest part ; but the large island in the centre of the lake eight miles in length by from two to three and a half in width, divides it into two distinct portions, and this in conjunction with the hundreds of the smaller islands and islets that dot its surface, prevents our having any clear idea of its magnitude while within its boundaries.

In fact so bewildering is the confusion of channels caused by the numerous islands and bays that a party of explorers are known to have been lost for several days among them and, being short of provisions, were saved only by the

timely appearance of an old Indian who chanced to be hunting in the vicinity.

The lower or southern portion of the lake is comparatively clear of islands and averages from a quarter of a mile to half a mile in width for the first seven or eight miles.

The land along this part is generally rolling and of average quality, some good hardwood growing here and there in patches. As we approach a narrow isthmus separating two large bays about four miles from where we enter Kaka-bonka, we find some very good pine growing.

A few miles beyond this on the right hand side the country is very low and, in consequence of the raising of the waters by the dam on the Gens de Terre, has been completely flooded, destroying whatever timber was on this land.

This overflow is the resort of numerous herds of cariboo which find their subsistence in winter chiefly from the thick covering of moss which grows on the dry wood.

Some of this land is of very good quality and could be easily cleared but while there was any lumbering going on, would be impossible of cultivation on account of the flooding.

The timber around the lake is as a rule pretty well mixed, good black and white cedar, spruce and banksian fir predominating, but on the ridges large groves of pine are seen, and I am told by guides that large quantities of valuable pine exist in the interior.

The country around the lake was virtually cleared of pine by the Gouin Bros. & Benson Bennett firms in the seventies, but as only the best quality of pine was then taken from the interior, it is reasonable to believe that large quantities still exist.

It is the intention I believe of the Gilmour & Hughson firm to begin operations in that direction in the near future.

From the point opposite the head of the Gens de Terre is probably where the finest view of the lake is to be had. The lake bordering the eastern shore, which is steep and mountainous, extends towards the north-east in an unbroken sheet, a mile or two in width, for the distance of nine miles, ending in a beautiful background of green slopes and blue mountains; on the left several groups of low islands and the gently rolling interior help to heighten the picturesque effect of the scene.

Most of the eastern shore has been burnt over and is covered with a young growth of white birch, but there are patches here and there of good green bush containing spruce, some pine, a little ash and white birch.

On the northern extremity the hills are well timbered principally with spruce and fir though there are some small groves of pine but of inferior quality.

The old R. C. chapel & H. B. Coy, post in this part are now abandoned and in ruins; the Kakabonga river comes into the lake a short distance north of the old post.

I found on some of the islands a very good quality of amber colored mica, surface indications promising good deposits; galena was also obtained but in small quantities.

Lake Washkega.—Leaving Kakabonga through the northern channel, we soon come into Lake Washkega a good sized body of water measuring six miles in length and averaging from half a mile to a mile in width, surrounded by high hills well timbered with large spruce and some pine on the north-eastern side. The south western shore is mostly old *brulé* and the land on both sides is very rocky and wholly unfit for use; this description suits the rest of the country we traverse till we come to Lake Barrière at its junction with Rapid lake..

At this point, not far from Symmes post is where the waters separate and flow in three different directions: part

through the channel we have just come by, part down Rapid lake and through its discharge into Kakabonka ; the other part flows into the Ottawa two miles below the H.B. Co. post.

From the head of Rapid lake to the H. B. Co. post, a distance of about four miles and a half, the country is rolling and covered with a good growth of mixed timber and scattering pine. By looking along this stretch you will notice a long narrow point running almost across the channel and marked with a cross on the plan.

At this spot, according to a story I heard recounted by one of the oldest Indians of the Tête de Boule tribe, occurred a fierce episode of Indian warfare.

The Iroquois, as was often their wont in those days, had come up by one of the numerous routes known to them on a scalping expedition, and had camped without making any fires, on this point for the night.

A Tête de Boule Indian, a large party of whom were encamped at the discharge of Lake Barrière, was paddling, along slowly, watching for deer, when he suddenly came upon the canoes.

Turning with alarm after recognizing the Iroquois by the shape of their craft, he hastened back quickly and informed the men of his tribe who, preparing themselves without delay, paddled away for the point.

Several of the braves went ahead and, after scuttling the canoes of the enemy, rejoined the main body who were ambushed in the rear of the unconscious foe.

Then, suddenly lighting their torches and with a wild warwhoop, they fell on the unsuspecting Iroquois, tomahawking them before they had time to rise. The few who had time to reach the beach were shot in the water as their canoes sank beneath them, till the whole band were massa-

cred, with the exception of one, who managed to swim across under a galling fire and, though twice wounded, succeeding in making good his escape.

It appears there were about 150 feet of them killed. Their bodies were left to rot on the beach, and one of my guides assured me that twenty years ago they could still see many of the skulls and bones on the point.

The H. B. Co. post at the Barrière comprises the offices, residence, the storehouse, sheds, stables and an Indian house.

The R. C. Mission chapel is a nice building very well finished inside.

There is considerable land cleared on this point; and most of the Indians in the environs also have some land cleared on which they raise good crops of vegetables and hay.

Fox River—Andousegemegama or Fox river runs into Lac Barrière a mile and a half below the H. B. Co. post.

The country along this river as we ascend towards the lake of the same name, a distance of about four miles, is fairly level and in some places flat, the soil good in some parts, and the timber mixed, with a little pine.

Lake Andousemegemegama. — Andousemegemegama lake is a nice sheet of water, very picturesque in appearance and presenting a variety of scenery not common among the lakes in this region. The lower portion of the lake is very level and thickly timbered with spruce and in some places tamarac, whilst on the upper south-western branch of this lake, which is divided in two by a narrow passage, the country is mountainous and the slopes covered with maple and other hardwood trees.

At the time we were surveying this lake about the middle of April, an Indian and his family were camped there

making sugar. The soil here is certainly of very good quality.

On the south-eastern branch the country, although diversified in appearance, is not as productive in timber nor does it show any good soil. The eastern shore of this branch is low and marshy, covered in front with stunted spruce and dry sticks while the southern portion presents a dreary aspect of bare hills and burnt tracts.

Following the watercourse for about a mile towards the east and through a swamp, we come to another small lake about three miles in length by half a mile in width apparently the head of these waters.

The ridge along the north-eastern portion of this lake is thickly covered with a beautiful growth of red and white pine running along a distance of about two miles. On the south side there are also several large groves of the same timber.

From the south-easternmost point of this lake a short portage of 30 chains takes us into Rapid lake as shown on the plan.

Rapid lake.—Once more on Rapid lake we took up the work at the station where we had left off in the fall, that is at the head of the discharge of Rapid lake into Kakebonga.

The discharge of Rapid lake a dead slow current about three miles in length flows through a rolling country; there is some pine along the course, one little rapid gives about 4 inches fall.

From this point at the head of the discharge, Rapid lake continuing on due north, bears a close resemblance to some portions of the lower Ottawa, specially in the first few miles, having an average width of half a mile bordered by

high banks and steep hills barely covered by a scanty second growth of white birch intermingled with spruce and fir.

Further on Rapid lake, while continuing about the same width, has a succession on either side of large and deep bays ; some of them curving in so that they cannot be seen while passing through the main channel.

The country here also takes on a better appearance, some of the level points jutting out into the lake showing such a splendid growth of hardwood that the soil must necessarily be of good quality ; at some places where we took special pains to examine it, we found a rich dark loam and no stones.

Along the ridges in some of the bays I saw some of the finest pine in the whole country.

Especially true in this of the deep bay where you will notice I connected my work with that on Kakabonga through a short portage.

As we approach the head of the lake where it joins Lac Barrière, the country does not present a very inviting appearance from either an agricultural or a lumbering point of view. All around towards the north that destructive element, fire, has left his grimy mark upon what must have once been a beautiful and well timbered country.

The high hills, magnificent distances, beautiful islands, still remain, pleasing to the eye from an artistic point of view but worthless otherwise.

A few words may not be amiss now about the game and game fish, of this region.

Of large game caribou is the most plentiful : in fact around Kakebonga, etc., seems to be their feeding ground in this part of the country.

Deer and moose are also to be found, but the moose is

being rapidly destroyed by the Indians who hunt them the whole year round.

Feathered game is represented by the ruffed grouse, or common grey partridge and spruce partridge while the ptarmigan or white partridge is often seen in winter ; some varieties of ducks spend the summer and breed in these regions.

The fur-bearing animals are chiefly the bear, fox, otter, marten, mink, hare, wolverine, lynx and the beaver, though the last, most interesting and valuable of our fur-bearing animals, will soon be exterminated unless some effective law is passed to save the species from extinction. Of fish, maskinongé, pike, large grey trout, doré, can be taken in any quantity; also splendid white fish in the fall with nets.

About a mile and a half below the H. B. Co's post and chapel at Lac Barrère, we pass the mouth of Fox river, on the left and at two miles we come to a small rapids on which there is a dam erected to prevent the waters of Lac Barrère and Lac Rapide from flowing by the Ottawa and to insure an abundance of water for driving lumber in the Gens de Terre river.

The fall in this rapid is about only two feet eight inches.

There is an Indian cemetery on the left bank here.

Lac Barrère.—From this point downwards there is a level stretch of about five miles through Mitchkan lake or big Barrère lake to the head of the rapids above Manwatan lake.

By building a dam at the head of the rapids at the point marked B on the plan, where there is a splendid site for a dam, there being a rocky island in the middle

and rock-bound shores on either side, the whole waters of the Ottawa might be diverted into the Gens de Terre.

The width of the river here is only about three hundred feet, and the average depth six feet.

The banks are sufficiently high to admit of raising the water six feet, while three feet would be sufficient to turn the waters into Lac Rapide and the Gens de Terre valley; and thus a great portion of the Ottawa and all that extensive region extending from there to the southern extremities of Lac Rapide, Bark lake and Kakabonka, would be all one unbroken chain of level water.

In case of a railway being built to pass anywhere in the vicinity of Kakabonka or Bark lake, this whole region, covering nearly one thousand square miles of territory, might be served with lines of steamers in connection with the railway.

Although the first quality of pine has been partly cut here some years ago, there is still a great deal in the interior, and owing to the great distance and roughness of the rivers, the cost of driving is such as to forbid the handling of spruce or second quality stuff of any kind.

With a railway and steamboat service, it would be different. Mills could be built on the spot and every kind of sawn lumber shipped by rail.

The rapids between Lake Barrière and Lake Manwatan or Calm lake is very rough.

There is a chute or fall of about nine feet and the total fall is about 35 feet in a distance of thirty chains.

Calm lake—Calm lake is a nice sheet of water, measuring about a mile and three quarters in length, with large bays on either side.

At the foot of Calm lake there is a small rapid of about

two feet fall and about ten chains. Below this the long portage takes in on the right to avoid four rapids in succession that give a total fall of thirty feet.

This portage is nearly two miles in length.

From the foot of this portage there is a beautiful stretch of river for about three miles running north-west by north to within about three quarters of a mile of the mouth of the Kapitajewan river where it turns sharply around to the left and runs a little east of south, broad, calm and majestic another three miles, until it empties itself into Lake Kamikwamika.

Lake Kamikwameka.—Lake Kamikwameka is a large and peculiarly shaped sheet of water.

An Indian named Nattawan has a considerable clearing near the north end of the lake, and has several head of cattle, for which he finds ample food both summer and winter in the long blue joint and other grasses, so plentiful in that neighborhood.

A violent rain storm overtook us on Lake Kamikwamika and prevented us from making a complete survey of the lake.

There was more than a foot and a half of water over the ice, so I only surveyed the central portion, leaving the large bay that runs south and also the large bays that run northward further down.

It appears that a branch of the river Kapitajewano runs into one of these bays somewhere north of the Rat Portage.

I intended making an accurate survey of that portion of the lake, but the season being advanced and every appearance of a thaw setting in, I thought it wiser to push on by the shortest route to Grand Lake Victoria and the du Moine waters before the spring opened up.

The eastern part of the shores of Lake Kamikwamika has been considerably damaged by fire, but the lower or western part is well timbered with pine, large birch, etc.,.

There are some large islands in the lower part of this lake that are actually covered with pine.

After passing through the Rat Portage, which is a narrow channel, dry at low water, but at ordinary stage of water is passable for canoes, we come into a large lake or bay which should still be part of Kamikwamika lake through which the main body of the river passes.

We cross this bay at right angles and enter a portage on the right bank eighteen chains in length, that takes us into a bay of Lake Obequon or Backbone lake.

By this portage we avoid some rapids that are on the discharge of Kamikwamika lake, near its entry into Lake Obequon.

The land is level all around here and well timbered with large white birch, tamarac, fir and some odd pine.

The general appearance of the woods and shores on either side gives promise of a soil worthy of cultivation in this neighborhood.

Lake Obequon.—Lake Obequon, or Backbone lake is a fine stretch of water measuring about nine miles in length on the main lines surveyed by us.

It averages from a quarter of a mile to nearly a mile in width.

The shores on either side together with the general aspect of the woods indicate a good soil, being chiefly timbered with large birch, fir, tamarac, spruce and pine of good quality.

This is called "Frying pan" river by Mr. Bignell, but the Indian guides and H.B. Co's officers who know the language inform me that this is a mistake.

A frying pan is called in the Indian language Sesequen, but the name of the river is Sosoquon, which signifies : where the water slides over the rocks. It might more properly be called "Cascade River."

On a rocky point on the left shore of the Ottawa, about six chains above the mouth of this river, I squared a green cedar tree which I inscribed H. O'S, 11th March, 1893.

The Sosoquon appears to be a large majestic river from four to five chains in width.

The land around here is very level and a rich growth of large birch, tamarac, fir, etc., indicates a rich soil.

Below the Sosoquon we perceive at once a great change in the appearance of the Ottawa.

At the point where I squared the small cedar tree above the Sosoquon, the Ottawa is not more than three chains in width.

From the mouth of the Sosoquon down to Birch lake, a distance of five miles, there is no part of the river less than six chains wide, and in many places it is over ten chains in width besides several bays on either side.

There are some good groves of pine on both sides of the river along here.

An Indian named Pierre Thomas lives near the upper end of the lake. He has a snug house and some other out-buildings.

About three miles further down the lake, there are two or three houses and an Indian cemetery on the right or north side of the lake.

This is the residence of the Grand Chief Papati.

The country all around here is more or less timbered with pine.

There are three or four clearings made by Indians and Squatters.

There was too much water over the ice on Birch Lake to attempt going by the discharge; so I took advantage of the short cut on which a road had been beaten during the early part of the winter.

The distance from Grand Chief Papati's to the Hudson's Bay post at Grand Lake, is only about eleven miles by this portage while by going around by the lake and river the distance is over twenty miles.

On this portage we cross several small lakes, and one large one which measured for about four miles.

Heavy rain prevented us from scaling the rest of it.

The land throughout this portage appears to be good.

There is a fair growth of mixed timber all over this part of the country, the slopes towards Birch Lake are especially well wooded with pine and other merchantable timber.

Very little more work would make a good road of this portage; it has been already well improved by the Hudson's Bay Co. for drawing hay from the clearings and grassy lands around Birch lake.

There is very little difference of level all over this country.

The weather was so changeable while I was crossing this portage that I could not depend on the barometric levels, and it was impossible with the limited time at my disposal to take the level otherwise.

I expected on reaching Grand Lake that I could go up the main river as far as the discharge of Birch lake, and thus control my barometric levels by taking the heights of the rapids with a spirit level as I had done all along on my

survey down the river ; but the ice on the main river gave out too soon to admit of doing this.

Grand Lake Victoria.—Grand Lake Victoria is one of the most curiously shaped lakes in the Province. Its extreme length from the southern extremity of Eagle bay to the northern extremity of Twenty-one Miles bay is thirty-two miles, and I believe that in the direction of Wasagewan bay, it is a good deal longer but there is no part of it that I know of more than two or three miles in width.

On arriving on the Grand Lake post, I was most kindly received by Mr. Christopherson, the gentleman in charge, who laid open his stores ; and every other service he could render was willingly given to assist us in carrying out the work.

Of course on arriving there, my first aim in accordance with my instructions was to ascertain the possibility and probable cost of diverting the Grand Lake Waters into the valley of the River Du Moine.

The first step towards this end was to examine the discharge of Grand Lake and see what height the banks would admit of its being raised by placing a dam there.

I was informed by Mr. Christopherson, that there were three discharges to Grand Lake while all the plans I had ever seen of the lake showed only one.

Having examined the discharges I proceeded at once to the height of land at the head of the Du Moine, and made a careful survey of the same, taking the levels very accurately with a spirit level.

The result of this operation has already been given you in detail.

Having completed the survey of Bay lake and the Du Moine watershed, with the other rivers and lakes on the way

down to Grand Lake. I surveyed part of the river upward from the H. B. Co. post in the direction of birch lake.

Here the ice was failing fast on the main river so I followed the portage north-westward expecting to strike the bay as shown on Mr. Symmes' plan.

Failing to find any such bay there, I continued my march westward for about three miles, where I struck the main body of the lake on the other side.

I did not regret my march, for I found the land across the point as shown by the red line to be in great part fit for cultivation.

There are patches of old *brûlé* overgrown with birch, poplar and soft maple with some splendid ridges of pine between.

We also crossed some very fine ridges of large birch and maple.

The soil is yellow loam, excepting the pine ridges which are generally sandy.

On making a careful survey of the lake I found that there was a bay further south something similar to the one shown by Mr. Symmes, but not more than half the size and about four miles south of where it should be according to Mr. Symmes's plan.

I surveyed twenty-one miles to its northern extremity. There appear to be some good flats of land all along this bay on both sides with a fair scattering of pine as far north as the portage to Rabbit lake shown on the plan ; but beyond that banksian pine seems to predominate, notwithstanding that ash, large birch and fur are found there also.

Having completed the survey of Twenty-one-Miles bay, I proceeded southward with the intention of continuing my survey to connect with Mr. Lindsay Russell's work at the

Grand Discharge ; but just as we reached the point marked "Blazed Cypres" on the plan, a high wind caused the ice to move and make a general break up, which put an end to our work at Grand lake for that season.

I regret that I was unable to finish the survey of this lake, as from what I could see, and from the information received from the Indian guides, the best timber and the best land are to be found in the environs of the south-west part of the lake particularly in the peninsula between Eagle bay and the Wasagawan, and I must say that the departmental plans of that section are not very reliable.

In the last mentioned report, I dwelt on the great advantage that would accrue from the diverting of the Lake Victoria waters by the valley of the Dumoine, if it were possible to do so ; but in the event that this may be found impossible a more desirable and beneficial alternative would be the building of a railway through that country.

Apart from the improvement suggested on a proceeding page of this report, viz : the damming of the Ottawa at the discharge of Lac Barrière and diverting its waters into Kakabonka, a glance at the general map of that region will show that between the discharge of Lac Barrière, and the discharge of Lac des Quinze, there are over six thousand square miles of territory drained by the Ottawa and its tributaries above Lac des Quinze, that can never be developed to any advantage without a railway.

I am not prepared to say that all this great extent of six thousand square miles is fit for agriculture or well timbered ; but I can safely say that more than half of this area is within the limits of the best pine growing region now available in the province, and that a great deal of good agricultural land may be found there also.

Lying as it does between the 47th and 48th degrees of north latitude, and its mean elevation not more than from 600 feet to 1,000 feet above sea level the climate, though per-

haps a little colder in winttr, cannot be very different from other settled portions of the province between the same parallels of latitude.

The valley of Lake St. John, and the Gaspé peninsula, are on an average from sixty to one hundred miles further north than the valley of the Ottawa between Lac Barrière and the head of Lake Temiscamingue.

With such a vast extent of I may say virgin forest awaiting access, with such a field for enterprise, in a word with such security for investment, it appears to me that if a project were once properly started, the capital necessary for the construction of a railway through there would not be long forthcoming.

If I may be allowed a word of digression before closing this report ; permit me to say that the local advantages, though very considerable are not the only inducements to the construction of such a railway.

In view of the present attitude of our southern neighbors, who threaten to block the passage of Canadian trains through their territory, if such a threat should be put into execution, the natural result will be, that Canadian companies will be obliged to do what they ought to have done long ago : that is to seek the shortest and best lines that can be had on our own territory.

Chapleau station on the C. P. Ry, the head of Lake Temiscamingue, Lac des Quinze, the southern extremity of Grand Lake Victoria, the southern part of Kakebonka lake, the Island farm on the Gatineau, Piscatossin lake, the Mat-tawin valley on the St-Maurice, Rivière à Pierre and Quebec, are nearly all in the same straight line.

A direct trunk line built through the above mentioned points would be about one hundred and fifty mlies shorter than any other line yet built on Canadian soil.

Perhaps force of circumstances may yet restore Quebec to that proud position for which nature destined her. At all events the construction of a railway line through the interior as above mentioned, would go far to restore her to her former position, as one of the foremost lumbering ports on the continent.

REGION OF THE RUPERT AND MARTEN RIVERS

In the course of my operations, I followed the Rupert River from its outlet from Lake Mistassini, as far as the portage crossing a watershed and from thence down the Marten river.

I began my operations at a post planted at the outlet of Lake Mistassini by C.E. Lemoine in the year 1899. From this point, the Rupert river divides itself into numerous channels, one of the largest going to the northward ; this channel I followed for a certain distance and when I perceived that I was not following the canoe route to Rupert House I returned and followed the other channel as far as its outlet from Miskittenau where it has two outlets at stations 447 (a) and 449 of plan. From this lake, I crossed by two small portages and a small pond, following the route to Rupert House to a large lake emptying into the Rupert river ; from this lake I crossed by a short portage on the waters of the Marten river, surveying all the lakes met with. When the Rupert leaves Mistassini lake it seems to spread out and makes several channels so that one would think that it was a lake covered with numerous islands ; in fact there are so many islands that it would be very difficult for any party travelling without a guide to find the canoe route to Rupert House, unless he were provided with a plan. In all my operations I followed and surveyed all the lakes on the canoe route as far as I went. The canoe route passes through all the portages shown on the plan.

The country passed through was generally of an undulating or level character, covered for the most part with a growth of black spruce of medium dimensions good for pulp ; in some places the country has been burnt over and is now overgrown with blue berries. All these burnt districts are shown on the plan.

Because of the numerous channels it was impossible in an exploration of the description I was making to determine the water-power of either the Rupert or Marten rivers, but when these rivers come together further down the main river should give an enormous water-power.

As remarked further up the timber is mostly black spruce good for pulp; in some places, this is a mixed with a few balsam and white birch.

The soil is generally of a sandy nature with clay sub-soil in some parts, and generally free from stones; if the climate was good I have no doubt that good crops could be grown, but I noticed heavy frost every month during my stay. Of course, I don't know what clearing and cultivation would do to improve the climate, but the Hudson's Bay Co.'s agent, at Mistassini, grows potatoes and other vegetables every year and told me he was sure that oats and other grain would ripen there.

There are quite a number of otter in the lakes, and bears are quite numerous. I saw no signs of beaver, but I suppose that there must be some in the smaller lakes and ponds.

Moose, caribou and deer are very scarce, so I was told by the Indians.

All the lakes are filled with fish, the Rupert being filled with trout, white fish, pike, etc., while there is no trout in the lakes of the Marten River, these lakes are well supplied with other kinds mentioned.

E. H. N. PITON,
P. L. S. (1903)

REGION OF LAKE MISTASSINI AND OF THE RUPERT AND MARTEN RIVERS

In accordance with instructions from your Department, to continue and complete the inspection of the surveys made by C. E. LeMoine, P.L.S., in the Mistassini and Rupert and Marten regions, and continue these surveys to connect with my former work at Nemiskau lake on the Rupert river, etc. I proceeded at once *via* Lake St. John and the Chamouchouan, Chigobiche and Nicobau rivers, and thence over the height of land, and through Obatagoman and Chibougamou rivers, to Mr. Mackenzie's camp on Asbestos Island at the northern extremity of the latter lake.

Mr. Maskenzie, with the greater part of his men, had left the mines a week or two before I reached there, but his foreman, Mr. Cummings, who had remained there in charge with a few other men, received us very kindly and showed us everything there was to be seen in the neighborhood of the mines.

A couple of days were spent in these environs, surveying Asbestos Island and the other larger island formerly called Malek Island, but now known as Margaret Island, named thus in honor of Mr. Mackenzie's daughter, who intends having a summer resort there, should the development of the mines require the presence of her father too long and too often in that vicinity.

We also took some notes and measurements of the gold-bearing quartz veins on Portage Island and photos of same.

We thence proceeded to the H. B. Coy's post at Mistassini lake, and, although it was never what one might call a luxurious abode on any former visit I had the honour of making there, it was far below its ordinary standard on this occasion.

My old friend, Mr. Miller, who had been in charge there for over thirty years, had on account of sore eyes been obliged to give up his post and return to his native home in the north of Scotland, and his son-in-law, Mr. Thomas Moore, was acting agent in his stead.

My first idea, on receipt of my instructions above mentioned was to send a scouting party ahead and see what supplies might be had at the post, for no matter what price we pay there, if supplies can be had on the spot it always pays to take them, and to take all the advantage we can of the long days and fine weather to carry on the survey. I discussed this with Mr. Low, and we both came to the conclusion that the chances were small of getting any supplies at Mistassini and that the surest way was to take a sufficient amount of provisions to do the work and we were right.

Arriving at Mistassini, there was not a thing to be had in the eating line beyond what their nets afforded,—no fish in the net—no breakfast. This seems rather hard, but it is a fact and the explanation given in this :—

The Company's agents tell me that if they send in an extra amount of supplies they get no furs. So long as the average Indian can get supplies, either for cash or credit, he will not hunt ; he will hang around the post, and often feign sickness, while he knows that there is pork and flour in the store, and it is only when all such hope is gone and hunger drives him to the woods that the company can expect to get furs.

Of course there are exceptions ; some families made good salaries by hunting,—\$1,500 to \$2,000, a year, but they are not the majority of the band. Poor old Mr. Moore and his good old wife—who by the way is a native of Moose Factory while he himself is a native of a post called Pike lake in the Nottaway basin, (now abandoned)—did all they could to oblige us in every way, but apart from their own little private hoardings of supplies, there was nothing else to be had,

and I began to fear that a delay in that vicinity would be dangerous for our larder.

Fortunately the first brigade with supplies from Rupert House arrived the following day with two canoe loads of flour and other necessities and, as they were returning the following week for another load, I made arrangements with them to pilot us to Lake Miskittenau while we proceeded on towards the discharge taking observations and measurements and fixing points for reference on our way back.

Our work of inspection commenced practically at the big narrows, called Chabotok, where we camped one night and on the following day proceeded to the head of the long point which separates Abatagush bay from the main body of the lake, where we camped and measured the distance of the outer islands and fixed permanent targets, carefully establishing their positions and distance apart to serve as base lines for determining the width of the main body of the lake from there to the western shore as shown on the plan.

We continued surveying islands and shore lines in that vicinity until the H. B. Co. brigade arrived, and we had all our extra supplies and baggage shipped in their large canoes and all moved down to Lake Miskittenau, the central point of our work.

Here we made a "cache" on an island, and spent a couple days taking observations, testing and adjusting our instruments, and making an inventory of our stock of supplies, etc., in a word a general over-hauling before separating, as it would be our last chance of having any additional supplies forwarded from Rupert House if the same were needed.

We there divided into two parties, my son Patrick O'Sullivan, taking charge of one party following the canoe route *via* the Marten river, while I, in charge of another

party, followed down what we supposed to be the main Rupert river.

Lake Miskittenau.—Lake Miskittenau is grand sheet of water measuring about $7\frac{1}{2}$ miles in length, and from half a mile to a mile and a half in width, and is studded with several picturesque islands. It receives a branch of the Rupert at its eastern end, and its main discharge flows off northward about two miles further west. It has another discharge about a mile and a half further west flowing north also, and these discharges meet about two miles further down forming an island about two miles in superficies.

Mount Miskittenau is a beautiful cone rising 768 feet above the level of the lake, and 1778 feet above tide level. Its summits and flanks are destitute of timber of any kind, whence the origin of its name, Miskittenau meaning bald or bare head in the Indian tongue.

About a mile below the confluence of these discharges above mentioned, a fair sized stream comes in from the north-east, and a quarter of a mile further down, a short steep rapid turns quickly towards the south-west, giving a fall of five feet and is passed by a short portage over the rocks on the left shore.

About a mile further down, we come to an expanse nearly a mile in width and two miles in length, lying north and south, and then the river flows westward from its northern end for about two miles through cascades and rapids, till we come to a large branch coming in from the south, the discharge of a chain of lakes on the Marten river route.

Here we are at the head of a large lake stretching north-westward for eleven miles and from one to two miles in width, with arms reaching out on either side, and dotted with over seventy-five islands. Its elevation is 980 feet

above sea level or thirty feet below the level of Lake Miskittenau.

A mile or two north-east of this lake, lies a chain of mountains parallel to the general trend of the lake, and some of the highest peaks attain an altitude of 600 feet above the level of the lake. There are also some mountains of lesser note on the west side

There are two discharges at the north-west end of this lake forming a very large island, but we only followed one of them, the most northerly channel; from thence the river flows in a west by south direction through rapids and expanses for a distance of sixteen miles in which distance there is a total fall of about fifty feet.

The country on either side is poor and broken, and sparsely timbered with small spruce, jack pine, poplar and birch, through which the barren rocks on the side hills are seen in every direction. Evidently this part of the country has been repeatedly overrun by fire and is now a vast waste of *brulé* interspersed with patches of second growth.

At the end of the latter stretch, we are down to 934 feet above sea level, and here is an expanse about a mile in width and two in length on which we descended northward with a good steady current in our favor, passing through the islands, and after we had gone a mile or so., we found a much stronger current coming head on against us.

This was hard to understand, but I was bound to find the cause, and pushed on until we came to a narrows where we camped for the night.

Here we found by astronomical observation the latitude to be $51^{\circ} 19' 55''$. The following day being Sunday, I spent the forenoon taking observations for time, latitude, and variation and measuring the flow of this mighty inlet;

and to check the current meter, I had floats made of tops of green spruce, with a stone attached to one end, so that they stood upright in the water with only a few inches floating above the surface.

Having measured two base lines, one on each side of the river, and planted flags at either end, and taken the soundings at 10 equal distances of thirty feet each, the river, being 300 feet wide, gave a mean depth of 30 feet, and an average velocity of 160 feet per minute, making a total flow of 1,440,000 cubic feet per minute. I found the magnetic variation here to be 20° 15' west.

We followed up the river and at $1\frac{1}{2}$ mile, came to rapids giving 4 feet fall at the head of which is a lake about two miles long and a mile wide; above this is a stretch of rapid water for another mile, and then it opens out into a beautiful large lake over ten miles in length and one to three miles in width with large bays extending on either side.

We followed it up to where we met a very strong rapid, above which the river seems to lie at right angles to its ordinary course, the flow through the rapids looking as if it were an overflow from the side of the river as shown on the plan.

We then followed down the north side of the lake and, near its western end, we found another discharge about half the volume of the one we had ascended, flowing westward in a stiff rapid.

Having completed the survey of this lake, we followed down the stream and soon came to another lake trending northward for another ten miles; this is divided up into channels and bays in the most bewildering manner possible.

One could hardly imagine that, descending such a large river, the Rupert, whose total discharge there must be

between two to three million cubic feet per minute, a man can lose his way, or more properly speaking, lose the river. But it is nevertheless a fact, for we lost it more than once on our way down.

There are so many different channels sufficiently large and deep that the entire waters might flow through them without making any very perceptible current, and you move on in what should be the proper direction, and before long find yourself stranded in a *cul de sac*.

There is hardly a lake or expanse of the river that has not two or more discharges. The country on either side has a sameness right through: barren patches or *brulé* interspersed with bunches of small black spruce, banksian pine, birch and poplar.

Near the most southerly discharge of this latter lake, I had an observation of the sun at its meridian passage and found the latitude to be 51° 24' 40''.

On this discharge there are rapids giving a total fall of eighteen feet, before it widens out into another large lake, and here there might be a good power developed if the water could be stored in the upper large lake. But it cannot, for there are too many broad discharges, so much so that there is scarcely a foot of difference of level between high and low mark on the upper lake; in fact, it may be compared to a large shallow plate or basin, full to the rim all the time, and any extraordinary rise from sudden rains or freshets, causes it to flow in a dozen places over its brim, to form new channels elsewhere, and this description may be applied to many of the lakes of that region.

We are now down to another large lake, 910 feet above sea level, which we followed south-westward for about five miles on the north-west side and, having located the position of a remarkable mountain whose summit, 600 feet above

the level of the lake, is crowned by a cap or bonnet so exactly like a Tam o'Shanter cap, that I called it Tam o'Shanter mountain; and the lake may fitly bear the same name, as a tribute to Burn's masterpiece.

I do not know how far south-westward this lake may run, but, from the point where we turned back, we could see open water for several miles on a course 220° S. 40° west. At its lower or north-eastern end, the main river flows in and then the united waters flow majestically northward two miles to where another large channel flows in from the north-west, which may be partly from the main river above and partly from the eastern branch followed by Mr. Lowe on his way to Nichicoon.

The fact is, it is impossible for one to do more than locate the main arteries of such a labyrinth of puzzling waters.

About a mile below the mouth of the last canal above mentioned another canal of goodly proportions flows off northward, coming back to meet the main river about 14 miles further down.

From the last mentioned outflow, the waters bend south-westward for nine miles, but here again we lost our river, for the same broad calm sheet of water extends $2\frac{1}{2}$ miles further in the same direction and then ends in a *cul-de sac*.

We then returned north-eastward and, after going a couple of miles beyond the point or tongue, we had previously passed, we were about to give up searching in that direction and look for the main river in the direction of Tam O'Shanter mountain as shown on the plan, but on taking what we thought was our lost course, we found that the river fell off northward in a brisk rapid.

From here the river flows in a northerly direction for

about seven miles, amidst cascades and rapids, giving a total fall of 45 feet, and thence takes a more decidedly westerly course to its junction with the Marten river, a distance of fifty miles.

On the last mentioned stretch, there are few lakes or expanses of any extent but there are several rapids and cascades capable of furnishing an abundance of water-power.

At the first five miles of this stretch, we come to a cascade giving a fall of ten feet which is passed by a short portage on the left and, three miles further down, there are a succession of falls and rapids giving a total fall of seventy-feet in a distance of less than a mile.

There are no beaten portages here, in fact this part of the river is seldom travelled nowadays. We could barely distinguish traces of an old portage on the right bank. On the left, the bank rises in perpendicular granite cliffs precluding all chances of portaging on that side.

The country all around here has been repeatedly burnt, and it is now a hungry looking waste of barren old *brulé*.

About three miles below the foot of the last rapids, we come to the end of the *brulé* or burnt district, and the line of demarcation between the burnt district and the green woods crosses the river nearly at right angles in a south by easterly direction in a nearly straight line.

About a mile and a half below the burnt area, we come to a fall thirty feet high, made in two jumps a few chains apart, which is passed by a portage over the rocks on the left bank and, about four miles further down, we come to the mouth of a small river on the north side which forms the canoe route to the H. B. Co's post at Nichicoon. This is the route by which all supplies are taken to the last mentioned post.

It takes four days from here to reach the post, one trip

in portages. All supplies of every kind except fish must be portaged through here, for nothing in the vegetable line can be raised at Nichicoon, not even potatoes.

About a mile and a half below the mouth of this river, we come to a cascade giving a fall of about 5 feet which is passed by a good short portage on the left.

We camped here over night and I found by astronomical observation, the latitude to be $51^{\circ} 30' 42''$ and the magnetic variation $19^{\circ} 40'$ west.

Below this the river flows broad and majestic for about twenty-four miles on a west by south course, bordered by thickly wooded hills and slopes on either side ; the chief timber being black spruce and banksian pine with patches of birch and poplar.

In the lower part of this stretch, there is a recently burnt area of about four miles on the south of the river. Below this the river expands to nearly two miles in width. or more properly speaking, is divided into numerous channels forming large islands and beaver meadows, covered with blue point and rushes.

Just below this expanse, a fair sized river comes from the north which we followed up a mile and a half, thinking all the time that this was the route to Nichicoon, as shown by Dr. Bell's plan to be nearly opposite the mouth of the Marten river; but we found later on that that canoe route only left the Rupert twenty-seven miles further up by the other river above mentioned.

The Rupert runs now nearly due south-west for seven miles to where it receives the waters of the Marten river, and thence flows placidly due west six miles to the head of the Chanomi falls.

At the Chanomi falls there is an excellent water-power of thirty feet head, which is passed by a good portage on

the right bank, and below the falls there is an additional fall of 15 feet in the Racy rapids extending for a mile below the falls, which are not too rough to run with loaded canoes by following down on the right side to the bend, and then crossing over to the left side and keeping close to shore.

We are now down to 575 feet above tide or 25 feet above the level of Lake Nemiskau, and distant 15 miles from the H. B. Co's post thereon, and have consequently made our last portage, but we have not yet ceased losing the river.

For the first six miles below this, the main river, glides placidly between well defined banks, after which it widens out into bays and lagoons, shoals and marshes, with intricate channels between shores and islands of peat, rising ten or twelve feet out of water and apparently as many feet under water; the sunken forest growth of centuries is seen on either side.

Nemiskau lakes.—On the left side of the river, there seems to be a considerable extent of old *brulé*, but on the right side it is all thickly covered with spruce, banksian pine and poplar.

We are now fairly launched on Lake Nemiskau, more properly speaking Lakes Nemiskau, forming a sort of inland sea, 35 miles in length from north-east to south-west, and from one to three miles in width, with many bays and lagoons, through which the Rupert river flows first for about ten miles in a south-westerly direction, and then runs north-eastward for another ten miles to the main discharge.

There is a similar discharge not far from the H. B. Co's post, which is a great short cut and is always followed by the H. B. Co's brigade on the route to Rupert House.

We surveyed the lake to its north-eastern extremity

which forms another canoe route to Nichicoon, but it is only followed during fall and spring freshets when the water is too strong and rough on the main Rupert river.

I was fortunate in getting a good observation before leaving the north-eastern extremity of the most northern arm of Lake Nemiskau, and found the latitude to be $51^{\circ} 30' 44''$, and the magnetic declination at this point was $17^{\circ} 45'$ west.

The country around the upper lake is thickly covered with spruce and banksian pine, and is in general level or gently rolling, except at the north-eastern end; a considerable area has been overrun by fire and is now sparsely covered with small second growth.

Ranges of hills or small mountains from 400 to 500 feet in elevation above the lake, are seen not far from the northern end of the lake.

From there we returned to the H. B. Co's post and completed the survey of the south-western end and connected with my survey of 1897, at the portage leading to Waswanipy as shown on the accompanying plan.

I found from a careful observation taken at the H. B. Co's post on Lake Nemiskau, the latitude to be $51^{\circ} 19' 00''$, and the magnetic variation $17^{\circ} 30'$ west.

The officer in charge of the Nemiskau post is a son of Mr. Miller, formerly agent at Mistassini, and like his father is a good hearted, obliging fellow.

Having thus completed my work in that direction, we returned to the mouth of the Marten river and began the traverse of these waters going east, but unfortunately while preparing the camp the first night on that river, one of my men named F. X. Bacon accidentally shot himself by pulling a loaded gun out of a canoe with the muzzle pointing

towards his breast. I have reported the details of that accident to the Hon. Attorney-General's office.

We sadly resumed our work of scaling the river eastward to meet my other party who were down the river in charge of my son as above stated.

Marten river.—The Marten river is a very difficult river to ascend for the first six or seven miles, in which the difference of level is over 100 feet, and the country on either side is poor and rocky and very sparsely timbered ; but once we get to the level of the other plateau, it is a very easy route, and the country becomes more level and better timbered.

Here we met the other first party on the first large lake, a little before noon on Sunday the 27th August, and found them all well. I just had time to take the latitude of the sun's meridian passage, 51° 09' 08'', and longitude by time and count, 76° 15' west. The magnetic variation was 19° west.

On the way down my son made a continuous survey of the main route with the micrometer and solar compass, from the head of Lake Miskittenau to where I met him, and, on the way back, I checked the work by astronomical observation, and completed the survey of lakes and bays on either side.

It is needless to lengthen this report with a detailed description of all the lakes and portages, etc., between there and Miskittenau, for a glance at the plan will show all better than it can be described in writing. Suffice it to say that it is in general a rolling plain, elevated from 800 to 1100 feet above sea level, and generally thickly covered with spruce, banksian pine, birch, wild cherry and poplar. All the old *brulés* were red with cherries.

Both soil and timber are decidedly better here than north of the Rupert, but yet I would not say that it is a

country fit for cultivation, and there is not much prospect of finding any minerals except perhaps iron, for it is all a granite formation.

There are a few isolated mountains in the neighborhood of Kamousitchouan, and again in approaching Miskittenau, but none so imposing as the Miskittenau mountain whose bald summit and even slopes attract the view from every side.

Arriving at the east end of Lake Miskittenau, we found our "cache" undisturbed and every thing in as good order when we left it in July.

This ends the report to accompany section No. 11 of my plans of surveys of that region, and although it is in reverse order, it is better to continue my report on section No 10 in the direction in which the surveys were made.

Before leaving section No 11 as I have spoken of finding our "cache" of provisions in as good order as when we left them in July, a word on that subject may not be out of place here, and the adage that things that are to be done must be learned by doing them, is exemplified more I believe on such expeditions than anywhere else.

The "*sine qua non*" of every expedition is to be sure to have sufficient supplies to carry you through; and although we often get fish and game enough to replenish our larder, is it a mistake to calculate on it, for generally, when supplies run short, you see no game, and fish may be scarce too. I know this from experience, and I have often heard it remarked by other explorers also.

Therefore on an expedition such as the one I am now describing, where you have to return by the same route you went by, it is well to make a "cache" to save trouble hauling and ensure you safe homeward trip. It may be useful to some of my readers to say a word or two on. "How to make a cache".

Bears, squirrels, rats and mice are the chief enemies we have to provide against. The carcajou or Indian Devil is generally given as the hunters' chief enemy, but for my part, after an experience of forty years in Canadian woods, I have no charge to make against that ill-reputed animal; in fact I never saw one except in a menagerie.

The first thing in making a "cache" is to choose a good site, and a small isolated island is decidedly the best place. Generally the islands are better wooded than the main shore, not being so subject to forest fires and less likely to be frequented by bears and other vicious animals.

A black spruce grove on the north side of an island, hidden from the view of passers by and well shaded from the sun, may be called a choice place for a "cache".

Having selected your spot, choose four trees forming an approximate square or rectangle large enough to hold what supplies you want to leave there; begin by cutting these trees, leaving their stumps seven or eight feet above the level of the ground. Cut notches in the tops of these stumps and lay stretchers across sufficiently strong to hold double the load you intend putting on it.

Then across these stretchers lay a flooring of good solid logs, and lay sheets of birch or spruce bark over it, the bark to exceed the flooring all around sufficiently to be tucked up around your supplies when laid on; then thatch the whole with a good covering of bark and tie all on safely with withes or spruce roots, called by Indians Watap, and lay some heavy weights on it sufficient to keep the wind from deranging the bark.

Then peel the bark off the four stumps and smoothe them off, so as to leave no foothold for animals to climb up, and leave no poles or trees standing sufficiently near to admit of animals climbing up and jumping on the "cache". Fixed in this way you may leave provisions for months, and

unless a hungry Indian or voyageur comes, you are pretty sure to find them safe and in good condition.

SECTION No. 10.

Starting from Lake Miskittenau going up stream, the general trend of the river is south-east for about three miles, broadening out in some places to nearly a mile in width, and near the end of this stretch, there is a stiff rapid passed by a portage on the north bank.

The river is here divided into two channels, and the total fall in the rapids is about ten feet.

From the head of these rapids, the river trends north-east for about eight miles, and in this stretch there are two falls: the first about $3\frac{1}{2}$ miles up, a clear drop of ten feet and, two miles beyond this, we meet another fall giving a total drop of twenty-seven feet; not far above the falls there are three rapids in succession, giving a total fall of eight feet. The rapids can be poled up, but the falls are passed by a portage on the south bank, about a third of a mile in length.

We are now up to an elevation of 1085 feet above sea level, and here the river broadens out into lakes and expanses, reaching ten miles nearly at right angles to its general course.

The country on the west and south sides is mostly barren old *brulé*, but on the east side it is covered with black spruce.

From the eastern extremity of this expanse, the river returns abruptly east, and is roughly broken with rapids and cascades, that give a difference of level of 49 feet in a distance of four miles. About midway in this latter stretch,

there is a rough rapid giving a total fall of 20 feet which is passed by a portage on the south side ; length 14 chains.

Here we are again in a multitude of waters stretching away on every side, but, after traversing about three miles due east, we must turn due south by west for another three miles to reach the rock portage, which is on the south or left bank of the river, to pass a heavy rapid giving a fall of ten feet.

Above this the river trends south-eastward and widens out into bays and expanses, in some places a mile in width, with numerous islands and rapids in the narrow channels.

Five miles above the rocky portage, we reach the mouth of the first channel coming in from the north and, three quarters of a mile further up, there is another channel coming in on the same side. We tried to survey both these channels, but found that there was not water enough to carry our canoes.

Just above the mouth of the last mentioned channel, there is a portage, thirty chains in length, on the north side, passing falls and cascades that give a fall of 20 feet and, a mile further up, we come to another portage ten chains long on the south side, passing a pretty little fall, a perpendicular drop of five feet.

Above this fall we are at an elevation of 1192 feet above sea level, or only eight feet below the level of Lake Mistassini, and here begins one of the most bewildering stretches of water imaginable.

According to all the plans of that region that I had seen, including the plans of the Geological Survey by Mr. C. E. Lemoine, then under inspection, the main Rupert river was supposed to pass through the east end of Lake Miskittenau, but, as explained in my report on section No 11, there was another river further east twice as large, carrying three

times the volume of water, and no one know where it came from.

Starting from the head of the last mentioned portage, my son took the right or south side, while I worked to the left or northward intending to follow the contour on either side until we met and then go through the numerous islands.

After going about a mile in a northerly direction, I found I was on a summit of water, so to speak, for one side of the river was running to the north-east and the other to the south-west ; I surveyed the latter down to connect with my work below the last mentioned portage, and returned and surveyed the northerly branch a couple of miles north-eastward, to where it tumbled over a rocky ledge of gneiss in deep broad channels flowing off north-eastward, as shown by the dotted lines on the plan.

Had it not been so late in the season, I would have continued the survey of this mighty river down to where I left it on section No. 11 as shown by the dotted course on both sections 10 and 11, or, had I known that this river existed, I certainly would have surveyed it down in the first place, but it was then too late to attempt doing it without running the risk of being frozen in for the winter.

We therefore continued the survey of the contour of this upper lake and its numerous islands eastward until we met my son and his party near the portage that leads to Lake Mistassini.

Although we saw no moose or caribou, and very few of their tracks, the great number of antlers we saw hung up with bears and beaver's skulls, etc., etc., on the different islands, at the scattered Indian camping grounds, go far to prove the existence of no small amount of large game in the country.

The land all around is a gently rolling black spruce plain, in some places low and flat, stretching into moss-

covered barren swamps, and the Indians say that the moose and the caribou herd there during summer, which accounts for our not seeing many of them on the main travelled routes.

Having made connection with Lake Mistassini at the lower portage, we continued the survey north-eastward to the upper discharge, and thence northward through another bewildering expanse of lakes, channels and islands, with bays and lagoons stretching out in every direction, as shown on the plan.

At the northern extremity of this expanse where it falls off in a rough rapid, I took an observation of the sun at its meridian passage, and found the latitude to be $51^{\circ} 9' 0''$ north, and variation 21° west.

There is a canoe route to the Hudson Bay post at Nichicoon by this river and this must be the route by which Mr. A. P. Low of the Geological Survey passed on his way to the head waters of the East Main river.

Where I left off the survey on this branch, it had an average width of 3 chains and an average depth of 4 feet, with a current of about four chains per minute.

Returning to the upper or grand discharge of Lake Mistassini, we surveyed the shore line north-eastward until I closed on the survey I made in 1898, and south-westward to where we had fixed our signals for determining the width of the lake in the large open space above the Chabatok narrows.

These signals had been fixed in July by placing large white cotton sheets at three different points, covering a base of nearly two miles which had been carefully measured and re-measured both with the micrometer and stadia, and the course between them accurately determined by astronomical observation.

But before leaving the bewildering archipelago of islands and channels that lie between the grand discharge and the Chabatok crossing, a word or two in further explanation is necessary.

By comparing Mr. Lemoine's plan with mine, it will be seen that about four miles south of the grand discharge or midway between there and the portage on the main canoe route to the Rupert, there is another smaller discharge, and that what Mr Lemoine thought was a point or prolongation of the main shore, is only a cluster of islands, and the most southern of these, made in the form of a squash about $\frac{3}{4}$ of a mile in length, is formed of cambrian limestone : all others are gneiss or granite.

The line of demarcation between the granite and cambrian limestone, is discernable here at the northern end of this island, and it trends from here about due south-west ; cutting the main shore about 8 miles south-west of said limestone island in latitude 50° 50' north : and about 8 miles due north of here there is another discharge that steals off to join the Rupert somewhere in the second expanse below the grand discharge.

The fact is that if the waters of Lake Mistassini could be raised ten or fifteen feet, several other discharges would be formed ; and, on the contrary, if the waters could be lowered, the chain of islands that nearly divide the lake in the middle, would become nearly all one island.

All the middle islands and the north-west and south-east shores as far as I have been towards the south-west, are composed of cambrian limestone.

Following down the westerly side of the lake to the narrow neck beyond which we did not go, the cambrian limestone is visible all along.

On the south-west side, gneiss is visible to within a mile or so of the bay which leads to the long portage. The land

rises in easy slopes on either side and is thickly covered with second growth of between thirty or forty years standing, chiefly spruce, poplar white birch with banksian pine on the drier knolls.

Following up the easterly shore from the long portage to the Chabatok, crossing several beautiful islands, the layers of cambrian then appear more like fortresses than islands ; the layers of cambrian limestone lie so even and regular, that one would imagine that it is regular masonry where the cliffs are perpendicular.

Having repeated my angles and all the measurements taken to ascertain the exact width of the lake, and continued the survey down to the Chatabok narrows, we surveyed the two islands north of there as shown on the plan.

I found by repeated measurements made most accurately for my base line, that the distance between the largest island and the point of the island immediately south-west of it was only 106 chains while, according to Mr. Lemoine's plan, the distance is over $2\frac{1}{2}$ miles.

In surveying the western shore of this larger island, I noticed an opening which I thought might be a channel, but found that it was only a lake within the island over a mile in length and half a mile in width.

At the narrow neck, there was a beaver dam that raised the waters of the inner lake about four feet above the general level of Mistassini lake.

The distance from the northern point of the Chabatok tongue to the island lying north-east of it, is only $\frac{3}{4}$ of a mile, while, by Mr. Lemoine's plan, it is about $2\frac{1}{2}$ miles. I would have liked to verify more of the surveys of these central islands, but as the season was getting too far advanced, and the weather getting cold, we did not wish to risk crossing the height of land after the 15th of October.

The larger streams are always open until November, but the small lakes lying on either side of the summit, are generally frozen over about the middle of October.

On our way back, I took an observation at the Chatabok narrows, and found the latitude to be $50^{\circ} 35' 54''$, and magnetic variation $21^{\circ} 00'$, west.

As grand Lake Mistassini and its environs have been already minutely described in my second report of progress,--pages 43 to 47,—published by your department in 1901, it is needless to lengthen this report with any further details of the topography of that region.

Climate.—I am sorry to say that in the valley of the Rupert river heavy frosts occurred in all the summer months.

Sometimes we had 5 or 6 degrees of frost in July and August and everything was frozen. On the first August we had ice half an inch thick.

Nevertheless, we had fine weather all summer. We lost only half a day during the whole trip on account of rain. It usually rained at night and the following day would be fine. We were delayed once or twice by fog.

We were on the Marten river during the eclipse, the weather was fine and we had an opportunity of getting a good observation of the phenomenon.

With regard to summer frosts, the climate is much safer around Lake Mistassini than in the Rupert river valley. I attribute this to the effect of that large sheet of water which does not cool down to freezing point until autumn is well advanced.

A good crop of potatoes was gathered at the Hudson's Bay Company's post last summer and, in view of the frosts

we had, I am sure it would have been impossible to grow potatoes in the Rupert river valley.

On our arrival at the Hudson's Bay Company's post we were courteously received by Mr. Isroff, the new agent, who had come from Nichicoon to replace Mr. Miller and, after a day of well-earned rest, we started to return by the Chief river and were fortunate enough to find the water in such good condition that we made the trip from Lake Mistassini to Roberval, Lake St. John, in six days.

While descending the Chief river I noticed a great improvement in the timber as compared to what it was when I last passed there, eight years ago. The places that had then been recently burned over, deserted or stripped, are now well covered with a young growth of spruce, banksian pine, white birch and poplar. In other places which were swept by fire three years ago, the trees have considerably increased in dimensions.

Minerals.—As already stated, the region comprised in this survey, with the exception of the Cambrian limestones of Lake Mistassini, is all a granite or gneiss country and there is not much hope of finding any minerals there with the exception perhaps of iron and mica. I have brought some specimens of rocks, and also have taken some photos of falls and rapids that may make this report more interesting if you intend having it published. These may be transmitted with my report on the Chibougamou mining region.

We arrived home about the middle of October, and were booked to start at once for Labrador, which delayed the work of completing these returns until to-day.

HENRY O'SULLIVAN, I. S. (1906).

JAMES BAY

Exploration of the south-east shore of James Bay.—Survey and Exploration of the eastern shore.—Little Nottaway, East Main, Jackfish, Patrick, Missisicabi and Hannah rivers.—Rupert House.

Starting from the head of tide water at the mouth of the great Nottaway river, described in my second report of progress, we surveyed the east shore of the estuary with its adjacent islands northward to the mouth of the Broad Back, or Little Nottaway river, a distance of fourteen miles.

As described in a previous report, this is a very important river draining the country from the rim of Grand Lake Mistassini basin to tide water on James Bay.

It was surveyed on the ice by the party I left at Rupert House during the winter of 1897-1898 for a distance of about 12 miles from its mouth and the country explored on either side and, as far as seen, it is chiefly a clayey plain, timbered mostly with black and grey spruce and some old tamarac as already mentioned in said report. On nearing the bay there is a considerable fall in the river which rushes turbulently over a rough bouldery bed. Here a good water-power may be had, the only place where one may be had near the coast, either in Ontario or Quebec.

Immediately north of its mouth lies Middleboro island, offering shelter to a harbor of limited space in the mouth of the river where from 15 to 20 feet of water is found at low tide.

Middleboro Island is separated from the main shore only by a narrow channel like an artificial canal, in some places less than 10 feet wide, through which the rising and falling tide rushes in and out with great rapidity. The Indian hunters take advantage of this and ascend midway and wait for the turn of the tide.

This channel could be easily dredged, for there appears to be nothing but clay, no stone being visible anywhere near, and the material taken from the centre would help to build up solid wharves on either side, while the island itself would offer a safe protection from the extraordinary tides that are sometimes driven by the north wind which sweeps without a break from Fox Channel nearly 1,000 miles southward, at certain seasons.

The difference of level between high and low water mark at ordinary tides is about 7 feet, but, sometimes, a continued northerly gale may roll up the water to an elevation of over twenty feet above the ordinary low tide mark.

The southern end of Middleboro Island is thickly covered with spruce, the land being more elevated, but the northern end slopes off in grassy plains, where the Hudson's Bay people let their cattle run until well on in October.

One year they lost all their cattle there by a sudden high tide driven southward by a fierce northern gale.

Between Middleboro Island and Rupert House, a distance of eight miles, four small streams enter the bay and the mouths of these streams are generally well stocked with sea-run speckled trout.

Here also are extensive flat grassy banks where the Hudson's Bay people cut hay for their cattle every year.

Rupert House is now the most important establishment on James Bay.

Formerly Moose Factory used to be the central point for distribution to supply the interior posts ; but of late years this has been changed and Rupert House is now the central point.

At Rupert the company has some very fine buildings

and there is ample depth of water right beside their stores for any craft that can pass the bar in the estuary.

They have several acres of land under cultivation where they raise all the vegetables they require, such as : potatoes, cabbages, turnips, onions and every kind of garden stuff, while the rich meadows found here and there along the coast furnish them amply with food for their cattle during winter.

They have good pasturage for their milk cows near the post, but their dry cattle they let run at large during summer.

Here all the heads of the interior posts meet with their crews who bring their furs, in June and July each year, and spend two or three weeks of social enjoyment, before returning again to their solitary homes with supplies for another year.

Looking north from Rupert House, a vast level wooded clayey plain covered with spruce meets the view. Seven miles north of the Rupert we came to the mouth of the Pontiac river which we surveyed for a distance of nine miles from its mouth.

It is no insignificant stream, measuring in many places over a half mile in width and is studded with many beautiful islands, and the country on either side is thickly timbered with grey and black spruce, fir, etc. The men at Rupert House say that the best spruce they get is on this river.

About two and a half miles north of the mouth of the Pontiac, another good sized stream comes in, called the Trout river, which we surveyed for about three miles from its mouth as shown on the map. The Indians say it is the best trout fishing stream of its size on the whole coast.

From the mouth of the Trout river the general trend of the coast is north-west for about twelve miles to the extreme westerly point of Sherrick Island, and thence it runs north-east by east for another twelve miles to the bottom of Boatswain's bay.

A great short cut is made here by following the narrow channel separating the Sherrick island from the main shore. This is a remarkable channel, and appears more like an artificial canal than a natural waterway.

Like that separating Middleboro island from the main shore, it is only at high tide that there is sufficient water to carry canoes over the summit, and here the channel is much narrower, having in many places barely sufficient width to pass a good sized canoe. The greater part of the channel is through prairie, and there are other deep narrow drains branching off at right angles through the broad grassy plains, in some places so straight and regular that one would think they were made by the hand of man.

We ascended it for about four miles. The country on either side appears to be low, heavy clay land covered with spruce, fir and tamarac, and inclined to be marshy towards the interior. In fact the country appears to be too level to have sufficient drainage between there and East Main river as far inland as can be seen from the shore.

East Main Fort, situated nearly 3 miles from the mouth of East Main river, is with the exception of Hamilton inlet, the most northerly mainland point fronting on tidal waters in the Province of Quebec being in latitude 52° 14' 45" north and longitude 78° 29' 15" west of Greenwich.

It was formerly one of the principal landing places on the coast, there being ample water for the largest ships to enter and anchor in the shelter of Governor's Island ; but, of late years, the company's vessels have been loading their freight on the west coast, although the shallowness of the

water there does not admit of their going within seven miles of the shore.

Mr. Isroff, who was in charge of the H. B. Co's establishment at East Main Fort, received us very kindly and offered to assist us in every way he could ; but, as the season was getting advanced, we only remained one day there to enjoy his hospitality before pulling up stakes to start on our homeward course. It was admitted by the majority of the Hudson Bay men whom I met, that East Main Fort takes the prize for good mutton and cabbage, and after spending a day with Mr. Isroff, I agreed in their verdict.

On our way back at 9 a.m. on the last day of August, we stopped at Dildally island, to boil the kettle, a custom with the H. B. Co's voyageurs, and on this occasion it suited me doubly to accede to their wishes. It was a beautiful clear, sunny morning, and, from an elevated clear spot on the south side of the island about 50 feet above sea level, I had a splendid view of the surrounding country. Having established the true meridian by an observation of the sun, I took courses to the most remarkable points in view ; but my main object was to get the true course of my station on Mount Sherrick and, although at a distance of thirty-five miles, I could clearly distinguish the clear blue head of the mountain top and, on its western slope to within a very small margin, the position of my point of observation herein-before mentioned.

The mean of several observations gave the course to be 209° 42' as shown on the plan.

While these observations were being made, the men were feasting themselves on blueberries and red currants which grow luxuriantly along the coast.

South of the island a clear, sandy bar extends seaward, offering one of the most delightful bathing grounds imaginable. As it was nearing noon and I wished to take an obser-

vation for latitude before leaving, I proposed we should lunch again before starting and in the meantime let the whole crew have a general bath.

The ordinary half-breeds are more easily coaxed to eat than to swim any day. No matter how often you propose lunch, they are always ready, but it is not so often you get them to strip and wash themselves. This day, however, I succeeded in getting them all to take a plunge and we enjoyed it immensely.

In the former report I spoke of swimming at Point Comfort in October, but I can assure you that bathing on the East Main coast in August and September is far preferable.

The water was in excellent condition, reminding one of Old Orchard Beach or Chester Bay. I have never found the water as warm in any part of the Gulf of St. Lawrence, or in Baie des Chaleurs as we found it on the East Main coast in the end of August and beginning of September, and I have no doubt that if easy communication could be had by rail, the most northern limit of our province would prove an attractive scene for tourists and health seekers. While waiting for the sun to come round to the noon mark, we saw a number of whales sporting themselves and blowing off their vapor, while closer to shore countless porpoises or white whales, as the H. B. Co. folk call them, were playing all around.

East Main River.—During the session about two months ago, I was asked for a report on the fisheries of Nottaway, Rupert and East Main rivers, which report I had to write from memory on the spot, and I could not say at the time whether there were sturgeon in the East Main river or not.

Since then, looking over my general observation notes, I find that the sturgeon fishing on the East Main is good,

and is a great boon to the Indians who frequent the post. All other kinds of fish, such as : pike, pikerel, trout, white fish, etc., etc., are taken in abundance. I heard that cod were taken in the bay here, but I had no opportunity of verifying it.

Having thus completed our survey of the East Main to the northern limit of the province, we returned to Rupert House where we replenished our stock of supplies and proceeded to continue the survey westward from where my winter survey party had left off chaining on the ice, in the neighborhood of Point Comfort.

The party I left at Rupert House during the winter of 1897-98 endeavoured to take soundings in the mouths of the rivers, but, owing to the heavy flow of the ice during fall and early winter freshets, all the main channels were completely blocked, making it useless to attempt any such work; and, while I was surveying the coast from the mouth of the Pontiac to East Main Fort, I left another party at Rupert to take soundings in the mouth of the Rupert and Nottaway, but unfortunately the result of their work was not very satisfactory either.

The great accumulation of sediment brought down by these mighty rivers during spring and fall freshets, spreads over the whole space between North point and the mouth of the Shebish river, forming shifting sand bars that will always render the navigation of these waters with heavy craft both difficult and expensive.

In the estuary of the Rupert, four miles west of its narrows at Rupert House, sand bars are known to be formed right across the full width of the main channel or channels, forming regular rapids at low tide.

According to Captain Taylor of the H.B. Co., there is deep channel extending from Stag Rock, in a direct line to Middleboro Island and the company's ships, when heavily

laden, anchor in the shelter of said Stag Rock to cross the bar at the mouth of the Rupert at high tide.

Along the west coast of Middleboro Island. I found a depth of 15 feet of water at low tide, but the channel is not very broad, and, midway between there and the mouth of the Shebish, I found only about 9 feet of water at half tide.

There is a narrow deep channel at the mouth of the Shebish, and craft drawing eight or ten feet of water can ascend that river a considerable distance during high tide.

The company's barges sometimes take shelter there in stormy weather, and I understand it is a very good river for trout.

From there to Black Bear point, there is nothing very remarkable; the land is level, clay soil covered with spruce, the banks being high but the beaches and shoals are muddy. On the right Mount Sherrick, Stag Rock and the imposing cluster of neat white buildings of Rupert House are the only discernible objects that break the monotony of the view over the broad expanse of the bay, with the dark green spruce forests rising gradually from the water's edge and fading into blue, where earth and sky meet.

Cabbage Willows bay was surveyed in winter, as shown by the red construction line on the plan, and it is very difficult to say where the bay ends or the land begins, or if there is any channel or river entering therein; for, when all the small willows and alders that generally grow on such low land bordering a bay or lake are levelled under the snow and ice, no one can say what is land or what is water.

Tradition has it that, at the time of the early voyageurs, Point Comfort and all the high land westward to Mesakonon was an island, and Cabbage Willow and Gull bays were all one. Later, canoes could only pass there at high tide, and finally could not pass at all.

This is due to the differential raising of the northern part of our continent, of which there is ample proof throughout the James Bay country.

On the north side of Lake Mattagami, an expansion of the Nottaway river, there is an overhanging cliff, completely sheltering a perpendicular rocky wall rising from the water-line of the day and on this rock can be seen for a goodly distance the water-lines of the former levels of the lake. Some of them can be distinctly traced for hundreds of feet, fully ten feet above the present high water mark. Around the shores of James Bay similar evidence of this land uplifting is seen in many places.

Wherever the banks are low and sandy, high dunes are raised by the action of the waves, particularly in stormy weather during high tides, and these dunes impound the water, forming often extensive salt water lakes, several feet above the level of the bay at low tide, offering great advantages to the hunters during the duck and goose shooting seasons.

These dunes run parallel to the shore line ; unless broken by the sudden outburst of a swollen stream, they retain their position and form and in course of time become overgrown with shrubbery, and finally with large timber.

This is the case in several places around the bay ; these dunes and lakes are seen along the present water line, but when we penetrate the woods behind them we find other similar dunes thickly overgrown with spruce and balsam and behind them again marshes and ponds, the sites of the former lakes formed by these dunes. There is no mistaking them.

Cedar, though found on most of the rivers emptying into James Bay from the south, is not indigenous to the sea coast ; in fact I have not seen on any of the rivers a single tree or shrub of cedar within miles of the sea ; and I have seen on the summits of some of these well timbered dunes,

fully ten to fifteen feet above the level of the highest tide of to-day, large cedar drift wood partly buried in the sand and overgrown with moss, but still sound enough to be identified and even to be used in many ways by the Indians.

Crossing from Black Bear point to Point Comfort, a distance of 9.15 miles, I took soundings over the greater part of it and was pleased to find about midway a depth of 43 feet at low tide. And this depth seemed to hold good as far as I went at right angles to our lines on either side.

I will refer to this again further on.

Continuing westward, from Point Comfort, the shore line is higher and more broken and heavily wooded all the way round to Misakonan point, a distance of sixteen miles. At Sawayan point, the most northern limit of the tongue that separates Rupert bay from Hannah bay, I was again fortunate in having clear weather to verify my course by solar observations and also in noting the true azimuths of our signals on Mount Sherrick and Point Comfort, as shown on the plan.

I had also taken similar observations at Black Bear Point and Point Comfort. All these true astronomical courses, taken in connection with the base lines chained on the ice, leave the entire survey of Rupert's bay indisputably correct.

We were not favored with such good weather from Misakonan point to the mouth of the Harricanaw river; but on the whole I think the survey will be found sufficiently correct.

The interprovincial boundary line between Ontario and Quebec, continued from the height of land south of Abitibi due north, may strike somewhere around Gull bay or Misakonan point, according to my observations, and according to some others it may strike further west, even as far west as the mouth of the Harricanaw. The rivers are for the

greater part Quebec rivers and it is all important to know where their mouths are situated. As I then intended to return by the Harricanaw, I continued my survey right through.

There is nothing very remarkable between Misakonan point and the Mississicabi river.

The land is generally marshy, and extensive stretches of prairie marsh or shrubbery meet the water-line the greater part of the way.

Mississicabi river.—The Mississicabi river is no insignificant stream. We followed it up a couple of miles from its mouth to where I saw a hunter's camp on the left bank.

This hunter belonged to Moose Factory, and as well as I could understand from him, the river reaches southward near to the height of land and, about opposite Lake Waswampi on the Nottaway there are some very fine lakes drained by it.

He also said that there was an abundance of excellent spruce along this river.

From the Mississicabi to the mouth of the Harricanaw, the land is low and marshy, slowly rising towards the south-east.

In the mouth of the Harricanaw, there is a large island about three miles long and a mile and a half in width, and on the right bank of the river, about a mile and a half above the island, is the site of the old H. B. Co. post to which is attached a weird story of the massacre of its inmates by Indians about a century ago.

We followed up the river and found that it forked into two nearly equal sized branches about ten miles from its mouth, and thence followed each branch about five miles further and found them both very difficult to ascend, being almost continual rapids above the forks.

It was getting late in the season, and, not meeting any hunters who could give us any information regarding the river or the difficulties to be met and, fearing that we might be frozen in and our stock of supplies run out before we could cross the height of land, we desisted and returned by Moose Factory and the Abittibi river.

I intended gauging the flow of the river before leaving, but a continuous downpour of rain for a day and a half before we left had raised its waters to such a pitch that it was useless to try to take soundings. It had certainly a larger flow than the Abittibi at that time, but possibly it may not be so continuous.

The land on either side is a level, clayey plain, gently falling towards the north-west, and is thickly covered with spruce and fir with scattering birch and tamarac.

Hannah Bay.—Hannah bay, although muddy, is a splendid looking sheet of water at high tide but at low tide it is the muddiest looking hole imaginable,—nothing but mud, mud, mud and still more mud as far as the eye can reach, through which even the flooded waters of the great Harricanaw river are almost lost before they reach the sea.

Neither in Hannah Bay nor in any other part of Ontario bordering on James Bay, is there any chance of finding a harbor for sea-going vessels.

On my way home I sketched the whole shore line from the south of the Harricanaw to Moose Factory, and the same shoal water extends all the way with here and there some outlying reefs, mostly all covered at high tide.

My son, Owen Sullivan, of the geological staff, was in charge of a party there last summer and surveyed the remainder of the Ontario shore line between Moose Factory and the mouth of the Albany river, and continued his survey of the shore line as far north as Cape Henrietta Maria.

He is now in charge of a party continuing the survey of the York Factory.

He says that there no chance of finding a port anywhere on the whole coast right around from Cape Sawayan to Cape Henrietta Maria, and I therefore humbly predict that the deep water roadstead found in Cabbage Willows bay, above referred to, may prove of mutual interest to both the provinces of Ontario and Quebec.

I have no doubt this deep water channel may extend very far in, towards the bottom of the bay, and even if it did not extend very far in, the remainder could be easily dredged, with the advantage of being far removed from the influence of the currents caused by the combined flow of the mighty rivers: the Rupert, the Nottaway and the Broadback, and dredging done there would remain a permanent useful work.

It might be found a not over expensive task to cut a deep channel right through from Cabbage Willows bay to Gull bay and the earth taken from there and thrown on either side would raise the land above the high tides.

The only wind that tells badly in James Bay is the north wind, and a haven here would be well protected from the north wind by the high capes of Point Comfort, Sawayan and Mesakonan.

From a strategic point of view, the site is exceptional; batteries could be erected on these points, and, with one situated on Mount Sherrick, they could sweep the whole bay.

Of course, at that present time, the idea of preparing for war in James Bay, may appear far fetched and chimerical, but we do not know what the future may bring; the best way to avoid war is to provide against it in years of peace.

The resources of the vast region of Hudson Bay are so little known that it is hard to conjecture what may happen in the course of a few years.

A few years ago Alaska was thought by the great majority of the people of the United States to be little better than a barren rocky frozen waste, and to-day they consider it one of the most important and promising parts of the Union.

But if there are no bloody war clouds looming on the far distant horizon, there is a commercial war now raging in our midst that will prove more disastrous to eastern Canada than any war of fire and sword that has ever visited the St. Lawrence Valley.

We are spending millions on building a great trans-continental railway with the reputed aim of securing Canadian trade through Canadian ports, and the results for good or evil to our Canadian Atlantic ports will wholly depend on how and where this great Grand Trunk Pacific Railway will be located through the provinces of Ontario and Quebec and how it will subsequently be managed.

If the idea of locating the line along the height of land between Clear lake on the Mattawin, and Lake Abittibi is persisted in, or if Lake Abittibi is touched at all, there can be only one result: the line will have to follow the valley of the Ottawa, and thence our trade will go by the Canada Atlantic Railway and other lines to the United States ports; and northern Quebec and northern Ontario will remain hunting grounds for the Indians for another age.

Without railway communication all the vast resources of the James bay and Hudson bay regions are worthless to the Government or anybody else; and it should therefore be the duty of both the Quebec and Ontario governments to endeavor to have this Grand Trunk Pacific Railway

located as far north as possible. About a year ago last March, I prepared for the Minister of Justice at Ottawa a plan and report on this very important subject of the most advisable location of said G. T. P. Ry between Quebec and Winnipeg, a copy of which report is hereto annexed.

You will find therein that, from the best knowledge we have of the country, a line touching Lake Matagami would be about the shortest, easiest and best possible line between said points, Quebec and Winnipeg; and, that from Lake Matagami, a branch line of about 100 miles through an almost level country would reach tide-water in Rupert's bay where the whole resources of the forests, fisheries and mineral wealth of the vast regions of the basin of James and Hudson bays could be concentrated.

HENRY O'SULLIVAN, P. L. S. (1905).

Report of survey from Rupert House on James Bay to Lake Temiscamingue via Lake Abittibi

Under instructions, after traversing from Lake St. John to James Bay as already reported on, I left a party at Rupert House to continue the survey and take soundings of the mouths of the river and explore the country on either side.

Not being provided with sufficiently warm tents and other outfits to winter there, they built themselves a log shanty at the mouth of the Rupert river from which point they surveyed and explored right and left, and measured base lines on the ice, for the continuation of the trigonometrical coast survey, already reported on, and in March and April 1898, they made a reconnaissance tract survey across country direct from Rupert House to Lake Abittibi, thence

over the height of land to the Ottawa waters and home via Lake Temiscamingue.

The accompanying plan is the result of their work. It was made shortly after the field work was done and would have been then deposited in the Department of Colonization and Mines, but it happened that at that time they were compiling a new map in the Department of Lands, Mines and Fisheries, and I lent it to Mr. Taché to have it reduced and laid down on their plan and for one reason or another it has remained there ever since.

I have now the honor to transmit it officially with the following report which is a summary of the notes taken by my assistants on the long overland trip *with snowshoes and toboggans*.

Broad Back river.—Starting from Rupert House they followed along shore on the ice for twelve miles to the mouth of the Broad Back river ; the land along the shore is a level clayey plain thickly timbered with spruce, balsam and poplar.

About four miles beyond the mouth of the Broad Back, they had to leave the ice and take through the woods for about 15 miles, on account of the ice jams caused by the freshets and the piled up floating ice driven by the northern gales.

On this stretch the land was a level clayey plain, partly open swamp and some parts thickly covered with spruce, balsam and poplar.

They struck the ice at the head of tide-water in the great Nottaway and followed up that river for about 8 miles, passing the mouth of the Apshicamish river about midway on the west side and camped on an island where an Indian family had been passing the winter.

They were advised to take through the woods from there, for the ice was treacherous on the rapid waters of both of the

Nottaway and the Apshicamish. They remained there over night and made an early start through the woods next morning.

Apshicamish river.—At 26 miles from the Nottaway they crossed the Apshicamish, and on the stretch they found level land gently falling towards the north-west, in some places thickly covered with spruce, balsam and poplar, and in places open swamp, where there was not sufficient slope for drainage.

Leaving the Apshicamish, they went due south and struck another fair-sized river running due west, which they followed up for about five miles, until they came to a lake about two miles in length by a mile in width.

This last stretch was about due south-east, of the same description: level country, partly well timbered with spruce, balsam and poplar and partly open swamp.

From said lake, they took through the woods again on a general south course and at 19 miles came to a large lake about nine miles in length by two miles in width, with a large bay extending northward; same description of country, level and partly swamp, and partly well wooded.

From the latter lake, they struck south-west for about thirty-nine miles, when they came to another good sized river and this stretch crossed two other fair sized streams, one of which they followed for about four miles.

All these rivers flow towards the north-west, the general fall of the land being in that direction.

These streams, as well as the discharge of the large lake above mentioned, must be tributaries of the river Missisicabi, which has its mouth in Hannah bay a few miles east of the mouth of the Harricanaw.

The discharge of the first mentioned lake is probably a tributary of the Shebish river falling into Rupert bay, a few miles north of the mouth of the Nottaway.

From the last mentioned river the general direction was south for about 26 miles, all through generally level country, with patches of open swamp and alternate ridges of well wooded land, chiefly spruce, balsam and poplar with some odd white birch and tamarac, the last six miles of this stretch being thickly covered with good spruce.

At the end of this stretch, they came to a lake about $2\frac{1}{2}$ miles long and from one to two miles in width, having a long point on the east stretching out in the centre to within half a mile of the opposite shore.

The surrounding country is thickly covered with spruce and birch.

Harricanaw river.—From the lake last mentioned, the general direction was south-west for about 42 miles to where they struck, about latitude $49^{\circ} 15'$ north, what must be a branch of the Harricanaw river flowing into the southern extremity of Hannah bay.

On this stretch they crossed one fair sized river and another pretty large stream both flowing westward.

In the vicinity of these rivers the land was thickly covered with large spruce and poplar and, where the country was rolling, chiefly balsam and banksian pine, with banksian pine on the drier knolls. The land in fact is good cultivable country except where too flat for sufficient drainage; the land was inclined to be swampy. Large birch and poplar indicate a rich soil in that northern country and they are found in abundance throughout this region.

They followed down the last mentioned stream which runs in a southerly direction for about four miles and then turns off westward and, leaving the river here and continuing straight nearly due south for about five miles, they came to a large river flowing north-west which must be the main branch of the Harricanaw river.

This latter stretch is thickly covered with large birch, poplar, spruce and tamarac.

They followed up the latter river in a nearly due south direction for nine miles where it turned eastward through a tamarac swamp and then they took the woods again in a south by west direction and, at ten miles from said river, came to the height of land between the Harricanaw and Abittibi waters.

Whitefish river.—On nearing the watershed, they crossed an old *brulé* partly overgrown with spruce and, about two miles beyond the summit, they passed an old cross marking an Indian grave and, at five miles from the height of land, they struck the Whitefish or Amikitek river which they followed southward for about 15 miles to where it emptied into the most easterly bay of Lake Abittibi.

All along the latter stretch, the land is level and free from stones and thickly covered with spruce, poplar, balsam, birch, tamarac and small ash.

Lake Abittibi.—Lake Abittibi is a magnificent sheet of water ; it might be more properly expressed by the words : Lakes Abittibi, for about the middle it narrows into only a few chains in width, dividing into two parts called the upper and lower lake. Its elevation is about 850 feet above sea level and it is studded with many beautiful islands, but the greater part of the upper and all the lower lake, must be in the Province of Ontario, for the provincial boundary line, continued due north from its present terminal at the height of land, would cut the upper lake about 13 miles west of the mouth of the Amikitek river, on the most easterly part of the lake. About 5 miles south-west of the mouth of the Amikitek river on a large tongue or peninsula on the right of the inlet is situated the Hudson's bay company's post, a rather imposing pile of buildings.

Mr. George McKenzie was the agent then in charge,

and he received the party with the proverbial good heartedness of the officers of that company.

After a couple of days of well earned rest there, they continued southward from the post of Lake Agotawikami, a distance of $10\frac{1}{2}$ miles.

Lake Agotawikami.—Lake Agotawikami is a magnificent sheet of water measuring about thirty-five miles in circumference and studded with many beautiful islands. The land all around is level or gently rolling and well covered with mixed timber, pine, spruce, balsam, poplar, birch, etc.

From the southern end of Lake Agotawikami, they followed up the inlet in a south by west direction for about fourteen miles when they came to another large lake, called Watawagogie, measuring about ten miles in length on its shortest canoe route and an average width from one to two miles with bays extending two to three miles on either side with numerous picturesque islands dotting it from one end to the other. The country around begins to show a more hilly appearance particularly on approaching its southern end, and the timber is more mixed, spruce and pine predominating.

Lake Opasataka.—Following up a small stream southward from its southern end, for about a mile, we come to a small lake, two miles in length by $\frac{1}{4}$ to $\frac{1}{2}$ mile in width, and immediately south of this is the portage over the height of land about $\frac{3}{4}$ of a mile in length that takes you to Lake Opasataka, a tributary of the Ottawa river offering an easy route to Rivière des Quinze and thence to the railway on Lake Temiscamingue.

It is needless to lengthen this report with any further details, as every thing is shown on the plan regarding soil, timber, water courses, etc. It may be said, in a word, that

the whole country, from Rupert to Abittibi is a vast unbroken clayey plain, gently falling towards the north-west, partly open swamp where there is not sufficient drainage, and partly well wooded with spruce, balsam, poplar, birch and some old tamarac, chiefly on the rolling uplands and along the rivers and streams.

A strange phenomenon or optical illusion was observed several times in crossing large open swamps and meadows; the country seemed to rise rather abruptly ahead of them as if a range of mountains lay right across their track, and, still marching on in the same direction without ever changing course, they never could come to or find these mountains or anything to prevent the building of a direct line of railway right through from one end to the other.

They found the depth of snow far less on the northern slope than in the Ottawa basin, and, in some of the open swamps or meadows in the latter end of March, they gathered cranberries on the sunny side of hillocks and knolls along their way.

With the exception of banksian pine, no other pine or hardwood was seen anywhere between Rupert and Abittibi, but between Lake Abittibi and the height of land some scattering white pine was seen.

There is a bunch of white pine at the discharge or northern end of Lake Abittibi which I consider to be the northern limit of the growth of that most valuable of our forest timbers.

HENRY O'SULLIVAN, I. S. (1905).

HUDSON'S BAY

Explorations to the south of Hudson's Bay

The climate of the region is much better than is commonly supposed. Our district extends from latitude 47° 45' to latitude 51°, the latter being south of that of London. Although it does not enjoy any exceptional advantage for these latitudes, neither does it suffer from the cold current of the western Atlantic, from which it is more than 1,000 miles distant. The low altitude of the plateau is greatly in favor of its climate, which may be considered as normal for the above latitudes.

Wheat is successfully cultivated around Lake St. John, at the head of the Saguenay river to the east, and it has been found to ripen on the Abittibi and Missinaibi rivers to the west there it has been tried on a small scale. If we draw a line connecting these localities, it will pass through the centre of our region, and it may be presumed that wheat will thrive throughout the tract from this line southward, if not to the north of it. Early in the spring of 1896 I sent small quantities of wheat and oats to the gentleman in charge of the Hudson's Bay Company's post on Lake Waswanipi, who is the only white person in the whole district. These samples were sown, and the wheat was nearly ripe when I visited the place in the middle of last August. Barley had been successfully raised at this post for many years. In the garden, peas and beans and all kinds of root crops were thriving well. Potatoes had always been a great success, and timothy grass and two kinds of clover were growing in a field. Indian corn was under trial for the first time, and it had put forth its silk at the above date.

Barley and all kinds of root crops have long been grown at Rupert House and Moose Factory, which lie beyond the northern limits of the whole district. In untried

regions we may be guided, to a great extent, as to the prospects for successful agriculture by the natural flora. It is generally conceded that wheat will ripen wherever the mountain maple (*Acer spicatum*) and the Saskatoon (*Ame-lanchier*) are to be found, and these bushes or small trees extend into the northern parts of the district.

There appears to be little doubt, therefore, that wheat and the coarser grains will ripen over a large portion of this region, and it may be assumed that hay, potatoes and all the ordinary root crops will grow throughout the whole area. Independently of grain-growing, we have, therefore, in this new region a very large amount of good land that will some day prove valuable for stock and dairy farming, which are now the most profitable branches of agriculture in Canada. At the posts of the Hudson's Bay Company on James bay, splendid cattle have been raised for more than a hundred years from improved stock imported from England and Scotland.

If two-thirds of the land in the district above described should prove to be good, it would amount to 25,000,000 acres. The region is practically inaccessible without a railway, which however, might be easily built from Quebec, Montreal or Ottawa.

ROBERT BELL, F. R. S. (1897).

HUDSON'S BAY

Exploration of part of the Hudson's Bay slope

Climate.—Notwithstanding the different reports to the contrary, there is every reason to believe that the climate of that region can compare favorably with the country along the St. Lawrence between Quebec and Montreal.

Father Albanel says that on the 15th of June, along the Rupert river, he saw wild roses blooming as lovely, and smelling as sweetly as any around Quebec.

He must have then been about sixty miles farther north than the farthest point reached by me.

At Waswanipi post, latitude: 49° 39' 55'', I saw on the 20th of September the potatoe tops as green as in midsummer, while on the Shoshoquon, 120 miles further south we had very severe frosts in August.

Of course, near the height of land, it would naturally be colder and more subject to early frosts; and in the neighborhood of Hudson's Bay, the low temperature of that immense body of water must have a cooling effect on the climate, but at a certain distance from these extremes I believe that a mild, genial climate favors the greater part of the land.

The isothermal lines laid down on the charts, should not be taken as evidence for the climate of that region; for these were necessarily taken from the records at the posts at Lake Abittibi which cannot be a fair average for the mean temperature of the country.

The most northern part reached by me is still a little south of the parallel of the city of Winnipeg.

The most northern boundary of the province of Manitoba is several miles north of the mouth of East Main river,

and fall, but at the time we reached it the water was too low.

I perceived here, a remarkable difference in both soil and timber. Rich clay land, no more banksian pine, no stones, the only timber to be seen around being large tamarac and alder.

The portage ended here, and perceiving that the bed of the stream was level for a considerable distance above the end of the portage, and that with the heavy clay banks on either side a dam could be temporarily made without too much labor, while the men were carrying the canoes, provisions and baggage over the portage, I began by throwing old logs across the stream at its narrowest point, and filling the spaces between them with green leafy alder boughs, and packing the whole face of the dam with sods from the heavy clay banks on either side. I succeeded in effectually stopping the water, by the time the men had finished carrying all over over the portage.

It was then getting dark so we camped here for the night.

We were pleased to see next morning that my dam had held good; the water being raised about 4 feet perpendicular and backed up for half a mile through the alder flats.

Before breakfast we broke the dam so as to give ample time for the flooded waters to partly descend ahead of us, and by the time that we had breakfasted, packed and started, we had a full flowing stream that carried us down to Lake Wequapathoshakamikak.

On this latter stretch the country is low and marshy along the stream, but the land rises in easy slopes not far distant.

Lake Wequapatoshakamikak.—Lake Wequapatoshakamikak is an irregular body of water about seven miles in

length and from half a mile to two miles in width. Its elevation is 950 feet above sea level.

In the Upper Ottawa valley, with exception of some outcroppings of white crystalline limestone in the neighborhood of Bay lake, the only formation visible is gneiss and granite and the soil is generally sandy and frequently paved with boulders. Immediately beyond the height of land, there is a remarkable change in topography and geological formation.

The soil is rich clay, no boulders, level and gently undulating land, no more banksian pine, but large poplar, birch and tamarac.

The geological formation is mostly all sedimentary rock.

There is an island near the south end of Lake Waquapatoshakamikak, that is simply a twisted mass of soapstone.

I collected some samples. The Indians make pipes of the stone here, which is soft enough to be carved and hollowed out in any desired shape with an ordinary pocket knife.

From a mean of six observations I found the latitude of this point to be 47° 59' 20" north and longitude 77° 18' 20" west.

The country around here is level with the exception of one ridge about $\frac{3}{4}$ of a mile to the right, on which I noticed a few fair sized pine: the low lands are covered with poplar, birch, tamarac, cedar and ash.

There are three rapids on the discharge of this lake in a distance of about a mile and a half, giving a total fall of 35 feet to reach Lake Simon.

The Waspatabi river, which drains Lake Matchi Manitou, comes in here from the east.

Lake Simon.—Lake Simon is a nice body of water, $2\frac{1}{2}$ miles in length by from half a mile to a mile and a half in width. It is called after one of my Indian guides Simon Papati, son of the grand chief of the Ottawa Indians and one of the best canoemen I have ever seen.

I found by a mean of six observations of the sun that the longitude of the discharge of this lake is $77^{\circ} 19'$ west of Greenwich.

Lake Matowikoma.—About $2\frac{1}{2}$ miles below Lake Simon we come to Lake Matowikoma (or river that strikes in the middle), its elevation is 912 feet above sea level.

A more beautiful stretch of water or more inviting shores on either side, can hardly be found than this river, between the lakes; level clay land, not a stone to be seen, and timbered on either side, with a luxuriant growth of scented poplar commonly called balm of Gilead, birch, tamarac, fir, cedar, etc.

We followed down Lake Matowikoma about four miles until we came to a portage on the left about a quarter of a mile in length, to avoid the falls and rapids of the main river, that give a total fall of 30 feet which brings us to Lake Obiska, 882 feet above sea level.

Lake Obiska.—Lake Obiska is another beautiful sheet of water about ten miles in length by from one to three miles in width.

The country along the eastern shore at the north end is rather hilly, and I noticed in the distance some scattering pine along the west shore and on the east side also, at the southern end of the lake the land rises in easy slopes, rich clay soil and free from stone.

On the west side of the lake about four miles, north of the discharge, a pretty large river comes in from the west.

One of the Indians who accompanied us from Grand Lake with his wife and children took leave of us there. His name is Wabinoni, which signifies clay land. His hunting grounds lie between here and Lake Abittibi.

He says that the same excellent clay land is found all through that country as we saw at Lake Obiska and from what I have learned from Mr. Bignell, P.L.S., who has explored the country north of Lake Expance to a little beyond the height of land I believe there is a wealth of unexplored territory in that direction.

About a mile below the mouth of the Wabinoni river, I found the longitude by solar observation to be 77° 18' 15" west.

At the discharge of Lake Obiska there is a rapid giving about 3 feet fall, and about $\frac{1}{2}$ a mile farther down we come to a cascade giving a fall of 5 feet at the head of which I hooked a large pike or maskinongé weighing about 25 pounds. He nearly pulled us down the cascade before we could land him.

About six miles below Lake Obiska, we come to another fair sized river coming in from the left, below which is a rapid called Caopiwiquasikak, or big black birch rapids. The Indian guides told me that the high lands in this neighborhood are covered with large birch and other hardwood, but all I could see in going along the river, was large birch, poplar, tamarac, etc., such as grow on all the low lands there.

About four miles farther down or ten miles below Lake Obiska we come to Lake Shobokoma.

On this stretch there are seven rapids giving a total fall of 30 feet. Excellent land on both sides, timbered with large birch, poplar, tamarac, etc.

Lake Shobokoma.—Lake Shobokoma which means “river passing through side of lake” is an immense body of water, some forty or fifty miles in length and from one to six miles in width. Near its northern end the river Mekiskan enters from the right or east side.

I found the point opposite the mouth of the Mekiskan as shown on the plan to be in latitude $48^{\circ} 26' 35''$ N. and longitude $77^{\circ} 10' 20''$ W. and at the point C, near the discharge, I found the latitude $48^{\circ} 41' 15''$ N. and longitude $77^{\circ} 05'$ W.

The country all around this lake is most inviting, rich clay soil, level, and free from stones.

Although the general formation around Lake Shobokoma, and in fact all over this country from the height of land northward as far as I have been is sedimentary rock, still there are here and there outcroppings of gneiss and granite containing beds of magnetic iron that render the magnetic compass very unreliable.

At the point C, the needle turned nearly end for end, the variation being 160° instead $140^{\circ} 00''$ the general declination of the magnetic meridian in that valley. The new aluminum solar instrument with clinometer I had made by Messrs. W. and L. E. Gurley rendered good service on this expedition.

I regretted being unable to explore the remainder of this lake, which the Indians say runs for over twenty miles in a northeasterly direction. I took some photographs from the point C, which show the easy slopes surrounding the lake.

The elevation of Lake Shobokoma is 850 feet above sea level.

From the head of the lake to the discharge, the distance is about 22 miles and the unexplored northeastern

end, say 20 miles, which would give the total length of the lake 42 miles, a rather surprisingly large sheet of water to have remained unknown until this date. Following down the discharge we soon come to a rapid giving a fall of about 4 feet and then another lake opens out, about 8 miles in length, and from half a mile to a mile in width.

The country on either side is most inviting: rich clay soil level or gently undulating and free from stones.

At the point D, I observed the latitude at the sun's meridian passage and found it to be 48° 44' 44" N.

At the foot of this lake there is a fall of 14 feet, and a succession of cascades and rapids, and finally a fall of 30 feet, giving in all a total fall of 80 feet, which brings us to a large stream coming in from the left, the mouth of which is 767 feet above sea level.

From there the river flows, broad and majestic, in a north-easterly direction, with only one small rapid in a distance of eleven miles, which brings us to the mouth of the Kiask Seebee or Cannon river.

Cannon river.—We leave the main river here and follow up the Cannon river for about a mile, and portage over to a bay below the fall of the main river as shown on the plan.

The fall here is about 30 feet; about a mile below the fall I found the latitude 48° 58' 40" and longitude 77° 03' 40" as shown at the point E on the plan.

About three miles farther down, after passing through two rapids, giving a total fall of about 10 feet, we come to an expanse in the river on which is situated the Indian house as shown on the plan.

Here there was a clearing of about 3 arpents which is partly grown wild. Still the rich spots of timothy and other

grasses here and there indicate a rich soil. The country is level all around here and well adapted for agriculture, but the Indians here like elsewhere soon get tired of farming.

About a mile below the Indian house, the river expands to nearly a mile in width and encloses some beautiful islands.

Beyond the Indian house none of my guides knew anything of the country.

Wedding river.—However we continued northward for about 19 miles, until we came to the mouth of a pretty large river coming in from the right, which I called Wedding river, having discovered it on the 15th September, the 20th anniversary of my wedding day.

One of my guides happened to get from an Indian on the Wasipatabé route, a sort of a plan of what he thought to be a route to Waswanipi in the direction of this river; but I must say that the Indians in this direction are not near such good draughtsmen as the Ottawa Indians.

It is surprising how some of the latter natives can trace out a canoe route.

Following up the Wedding river about 9 miles, we come to two forks. The first is a fair-sized stream on the north side, and the second is a branch coming in from the south-east nearly as large as the main stream.

There is no better land in Canada than is to be found all along this river. About 32 miles from the mouth we come to a lake about 3 miles in length and from half a mile to a mile and a half in width.

I observed the latitude at three different points along this river as shown on the plan.

The last taken near the height of land between the

Mekiskan and Waswanipi waters is 49° 20' 53'', and the longitude 76° 45' W.

The elevation of the mouth of the river at F is 700 feet and the source at the height of land between the Mekiskan and Waswanipi waters is 920 feet above sea level at the point G.

There are several small rapids and cascades on the Wedding river, but the country is in general level, slightly falling towards the west.

There is an abundance of tamarac, birch and poplar all along, some of the latter two feet in diameter, running 50 or 60 feet without a limb or knot.

I examined the land in several places and found often from 2 to 3 feet of rich black vegetable mould overlying the clay. The portage over the height of land is about 2¼ miles over a rolling burnt country, and thence starting first, on a small stream flowing through low swampy lands and beaver meadows, it is soon increased by three larger streams coming from the north-west. Keeping a north-east course for a distance of 12 miles on this stream which I called the Otter creek, we come to the south branch of the Waswanipi river in latitude 49° 26' 40'' and longitude 76° 32' 25'' W. and elevation 735 feet above sea level.

On the Otter creek we had to break through seven beaver dams in succession one afternoon.

This stream is actually alive with beaver and otter, so much so that one of the Ottawa Indians expressed his intention of taking a Waswanipi woman to give him the right to hunt there.

All the Indian families have their allotted hunting grounds, and this hereditary right is vested in the woman. Any man marrying an Indian woman there has the right

of hunting on her grounds, which is not much in keeping with our Ottawa Indian act.

Leaving the mouth of the Otter creek a level stretch of broad river running north by west, for about a mile and a half, takes us to the Metabetchouan portage, about $1\frac{1}{4}$ mile in length which takes us to the shore of Lake Waswanipi, avoiding the cascades and rapids on the river which give a total fall of 55 feet.

The soil on this portage is of excellent quality and the timber large and exceedingly tall.

I have seen spruce trees there not more than $2\frac{1}{2}$ feet in diameter that were over 100 feet in height. The tamarac, poplar and birch are very large there also.

Lake Waswanipi.—Lake Waswanipi is a magnificent sheet of water surrounded by a splendid looking country, level or gently rising in easy slopes of the richest soil all around, timbered with large spruce, fir, tamarac, birch, poplar, etc.

The elevation of the lake is 680 feet above sea level.

Following the eastern shore from point to point, from the Metabetchouan portage at the south end to the Hudson's Bay Company's post at the north end the distance is 20 miles as shown on the plan, and there are bays that extend inland from this line some three or four miles. The Indians inform me that it is about the same distance going westward from the Metabetchouan portage to the south-east end of the lake, and that the detour of the lake sweeps around south westward from the Hudson's Bay post several miles to where a short portage takes you back into a bay that comes in from the south end giving the whole lake a circular shape with a large *presqu'île* in the centre.

I regretted being unable to explore the whole of this

lake, but the season was too far advanced and supplies were rather scarce to risk any longer in that region.

I therefore contented myself with fixing a few astronomical points and taking in all I could of the lake on my way back as shown on the plan.

Waswanipi river.—The H. B. Co. post (situated on a promontory formed by the bend in the main Waswanipi river, where it may be said to only touch the northern end of the lake) commands a splendid view of the surrounding country.

I found by astronomical observations that the summit of the dune or mount in rear of the post where a large cross is planted as shown by photograph and marked by the point H on the accompanying plan, is in latitude N. 49° 39' 55" N. and in longitude 76° 34' W.

I followed down the main Waswanipi river about three miles. This is no ordinary stream. It takes its rise near the head waters of Chamouchouan river in the neighborhood of Grand Lake Mistassini and forms the main body of the Nottaway river which flows into James bay, not far southwest of Rupert House. It is nearly a quarter of a mile in width, deep water, and swift current, fully as powerful as the Ottawa river at Mattawa, and the country on either side can be compared with any part of the Dominion for richness of soil.

It appears that the same excellent clay land extends a great distance northward.

Mekiskan river.—About 60 miles below Lake Waswanipi there is another large lake, which the clerk at the post informs me is larger than Lake Waswanipi, where the Mekiskan and Waswanipi waters unite and from thence to its mouth on James bay it is called the Nottaway river.

Nottaway is the word used for Iroquois by the northern Indians.

It appears that the Mekiskan and Waswanipi rivers were thus named by the Indians, the former meaning a fishing hook and the latter a spear, for at the mouths of these rivers on the large lake above mentioned they catch lots of large fish with hook and line, on the Mekiskan, and they spear immense sized fish on the Waswanipi.

The Hudson's Bay post is supplied from Rupert House. A canoe route leads from here to Lake Mistassini.

It appears that this route is better and shorter than by following the Rupert river.

On going to Rupert House they cross over from the Nottaway to another large river called Swillbark river, which they follow for a certain distance and then cross to the Rupert river, which they follow to James bay.

Light canoes can run to Rupert House in a week from Waswanipi, but it sometimes takes loaded canoes a month to come up; last year they were 20 days on the up trip.

I was sorry that Mr. Baxter, the gentleman in charge of the H. B. post, was absent at the time I was there, but his wife and all the assistants were exceedingly kind to us.

Mr. J. G. Moor, the principal assistant, is a native of Rupert House on James bay, and has been 30 years in the company's service. From him I obtained a good deal of information regarding the country.

He told me that he was up the main Waswanipi river for upwards of sixty miles in the direction of Lake Mistassini, and that he found the same excellent level clay land as far as he went. He says there are some very fine lakes in that direction. Had it been earlier in the season, I would have liked to take a run in that direction, but as we

were nearing October I thought it safer to point for home and leave the exploration of that region for another season.

The stock of provisions at the H. B. Co's post was very limited; nevertheless they freely shared with me all they could spare; and having engaged two Indian guides who knew the route *viâ* the old Mekiskan post, I decided on returning by that route in order to explore as much as possible of that region on my way back.

Returning we followed the west shore of Lake Waswanipi as shown on the plan, and thence back by the Metabetchouan portage to the mouth of the Otter creek which has been already described.

Starting from the mouth of the Otter creek we followed up the main river about three miles, passing two small rapids that give a total fall of 8 feet.

At the head of the last rapids begins Lake Pakitamika or Lake of the Narrows, 744 feet above sea level.

Lake of the Narrows.—This is an immense lake. By the Indians' account it must be over thirty miles in length and very broad at the upper end. The country around is hilly near the discharge, but opens out in fine easy slopes well timbered with large spruce, tamarac, poplar, etc., particularly looking eastward from the main body of the lake.

On an island at the point L, I found the latitude to be 49° 24' 35" N. and the longitude 76° 27' 45" W.

Continuing on a west by south course about three miles across the lake, we come to the mouth of the main river or inlet, where on the south side rises Mount Wabigomigi or Leafy Mountain, the summit of which is about 1,000 feet above the level of the lake.

This remarkable cone, evidently of volcanic origin, can be seen at a great distance from every part of the surrounding country.

Following up the stream about four miles, we come to the forks where the main branch of the river turns to the north-east as shown on the plan.

There is an abundance of large tamarac in this region.

We leave the main river here and follow up the similar branch that comes in from the south-west.

The country now becomes more rocky and broken.

There are alternately ranges of burnt crags and level clay flats; a country much resembling the townships of Duhamel and Fabre, on the eastern shore of Lake Temiscamingue.

There are a good many rapids on this river that give an elevation of nearly 100 feet in about 15 miles, the elevation at the point M being 799 feet and the point N 896 feet above sea level.

About two miles below the forks at N, I saw an Indian grave on the east side of the river, as shown on the plan. Strange to say none of my Waswanipi Indians knew who was buried there, although the grave was nicely fenced in and all his hunting equipage was carefully laid on the mound, apparently in view of assisting him in his passage to the happy hunting grounds beyond the Jordan.

About four miles below this point I found the latitude 49° 15' 15'', and longitude 76° 15' 53'' W., as shown on the plan.

There is good level clay land on both sides all along here.

We left the main branch at the point N, and followed up a crooked creek on a general due south course about six miles in a direct line, but owing to the extraordinary crookedness of the stream the sailing distance is not less than

twenty-five miles, and thence through a chain of lakes and portages, still due south ten miles brings us to Witetnagami, which discharges by the main river we left at the point N.

Lake Witetnagami.—Lake Witetnagami is 16 miles in length on our canoe route. At the lower end it is from one to three miles in width, but the upper end is narrow.

At the portage at the southern end of the lake, marked O on the plan, I found the latitude 48° 47' 15" N. and longitude 76° 17' 30" W. The elevation is 1055 feet above sea level.

The Indians say that Witetnagami is another name which is sometimes applied to his sable majesty, instead of Matchi Manitou.

The country around here is rough and broken. Along the west shore, cliffs of granite and gneiss rise perpendicularly from the lake's edge.

Splendid quarries might be had here, the stone is a beautiful reddish pink colour. I caught some splendid large pickerel, maskinongé and pike in this lake.

A portage of about a mile through rough *brulé* takes us to another lake about a mile wide and 1105 feet above sea level.

Lake Macoostigan.—From this a short portage of quarter of a mile over rough barren *brulé* takes us to Lake Macoostigan or Loon lake, an irregular sheet of water about three miles in length, with bays on either side from $\frac{1}{2}$ a mile to a mile deep.

The lake is 1140 feet above sea level.

From there a short portage of five chains takes us into another small lake, the last of this chain of lakes of the Waswanipi waters.

On the west side of this lake there is a remarkable granite pile about 250 feet in height and the same in width, that at a distance looks like a Martello tower, standing out in the barren *brulés*.

The portage across the height of land is $1\frac{1}{8}$ mile in length, through an open *brulé*. The summit is 1160 feet above sea level.

The country all around here is rocky, worthless *brulé*.

At the southern end of the portage marked P on the plan, I observed the latitude to be 48° 40' 42" N. and longitude 76° 15' 20" W., elevation 1118 feet above sea level.

After leaving the portage we pass for about five miles through a crooked lake with many winding bays, surrounded by barren hills and crags, until we come to a portage on the right, to avoid rapids and cascades that give a fall of 35 feet; thence another stretch of about five miles with some small rapids and widening bays, bring us to the Mekiskan river, 1080 feet above sea level.

The general fall of the country here is to the southwest.

The Mekiskan river here is still a powerful body of water, about six chains in width, deep water, with a current of from 2 to 3 miles per hour.

Ascending the river there is a level stretch of about $3\frac{1}{2}$ miles, and then two rapids, about 6 feet rise in each. About a mile above these rapids the river expands into large bays on either side and is dotted with numerous islands.

The soil along the river is loamy, and there is a considerable quantity of spruce on the north side, but judging from the knolls of banksian pine on the south side and the general appearance of the country I should say that there is not much good land in that direction.

Above these lakes and expanses there is a level straight stretch of river of about three miles in length to where two large creeks come in, one on each side of the river.

The first on the north side is a fair-sized creek, but the one on the south side, a little farther up, called the White Goose river, is twice as large.

The country around here is level with loamy soil and mixed timber. The mouth of the White Goose river is 1096 feet above sea level.

Ascending the main Mekiskan river about four miles we come to a cascade giving a rise of about 8 feet.

The portage is made on the island in the middle of the cascade as shown on the plan.

About two miles above the rapid at the point marked R, I found the latitude 48° 35' 48" N., elevation 1105 feet above sea level.

From this point up to the old abandoned Hudson's Bay Co. post, there is a succession of lakes and bays extending for miles on either side and dotted with numerous islands.

The country around here is rough and hilly.

About a mile below the said old post there is a rapid, giving a rise of about 4 feet, and then another succession of lakes, bays and expanses.

My Waswanipi guides, not knowing the route any farther than the Mekiskan post I paid them off here, and engaged some Mekiskan Indians whom I happened to meet on the spot; but I found that these Indians did not know any direct route, across the height of lands to the Kapitajewan waters, the only route they knew was one leading out to the head of the Ottawa by Lake Ashwaham.

Finding that this was too great a round I resolved to try and find some more direct route to connect with my work on the Kapitajewan.

Starting from the said old Mekiskan post marked R on the plan, we passed through a series of lakes, bays, narrows and expanses for a distance of about twelve miles on a general south course until we left the main river at the point S. This stretch of water is 1112 feet above sea level.

The surrounding country has ben mostly all over-run by fire and is now partly covered with a second growth of banksian pine, white birch, tamarac, etc.

Continuing southward from the point S. where the main river turns sharply eastward, we follow along a creek that winds through beaver meadows and tall bluejoint banks for about 4 miles to where a large branch comes in from the west.

About a mile north of these forks as at T on the plan, I found the latitude: 48° 23' 52" N. and the elevation above sea level 1125 feet.

Folowing the main branch southward for about 16 miles, we pass the mouths of four good sized creeks, two on each side and several rapids that bring us to an elevation of 1220 feet at the point U where the main branch of the river turns westward and we portage into a chain of small lakes.

Following the chain of lakes and portages, still in a southern direction for about 9 miles, we come to the height of land, between the Ottawa and Hudson's Bay waters in latitude 48°, 08', 45" N. and longitude 75°, 53', 45" W.

The portage over the height of land is through a comparatively level *brulé* about $\frac{3}{4}$ of a mile, the summit of which is 1310 feet above sea level.

On the Kapitajewan waters we first pass through a small lake about a mile in length and then a short portage of

five or six chains along the discharge brings us to a creek about 15 feet wide coming from the north-east, which we follow down, still southward about $2\frac{1}{2}$ miles in a direct line, but by the crookedness of the river must be over six miles to where it empties into Lake Kapitajewan.

About a mile before reaching the lake we pass the mouth of another large creek coming from the east.

At the point marked W on the left shore of Lake Kapitajewan, I found the latitude $48^{\circ} 08' 04''$ N. and longitude $75^{\circ} 52' 40''$ W. and the elevation of the lake 1290 feet above sea level.

The description of the remainder of the route will be found in my report accompanying sheet No. 8 of regular survey of the Kapitajewan and Kamichigama rivers.

On my way down I established the latitude at the points I, X and Z as shown on the plan.

I closed on the point Z, it being the terminal point of the Wagner line and a closing point of my survey of 1893.

Having camped at this point I found by a mean of several observations the latitude to be $47^{\circ} 36' 30''$ N. and the longitude $76^{\circ} 34' 30''$ W.

The description of the Ottawa from Z to A will be found in my report, published in the report of the Hon. Commissioner of Crown Lands, for 1894.

General Observations.—There can be very little doubt from what I have seen, that there exists beyond the sources of the Ottawa, a fertile region several thousand square miles in extent, where there is an abundance of merchantable timber, principally tamarac, of which there is a sufficient quantity to supply sleepers for all the railways in the Dominion.

A glance at the latest map of the Province of Quebec, with outline indications of adjacent Provinces and States,

published by the Department of Crown Lands in 1893, will show a vast extent of ~~country~~, bounded on the north by the Rupert river and James ~~bay~~, on the east by Lake Mistassini and the head waters of the ~~Ashuanouchouan~~ and St. Maurice rivers, on the south by the height of land dividing the St. Lawrence from the Hudson's bay waters, and on the west by the Province of Ontario, that up to last year ~~was as~~ little known as it was in the days of Jacques-Cartier.

Roughly speaking, this vast region extends over about three degrees of latitude and five degrees of longitude, containing about 50,000 squares miles or 32,000,000 acres; equal in area to the whole of England and one third larger than Ireland.

That such an extent of country should remain unexplored and unknown at the end of this 19th century appears hardly credible ; still the fact is that with the exception of what was learned from the exploration made by my esteemed old *confrère*, Mr. John Bignell, in 1872, at the heads of the St. Maurice, Gatineau, Mekiskan and Ottawa rivers, and his subsequent expedition to Lake Mistassini and the conflicting reports on the same, the Government had no official data regarding that northern region.

Messrs. McQuat, Richardson, Dr. Bell, and lastly Mr. A. P. Low, of the Geological Department, have done good service in the Abittibi region and from the Gatineau eastward along the height of land to Lake Mistassini, but none of them ever penetrated the region I speak of.

Reverend Father Albanel's account of his journey via the Saguenay and Rupert river to Hudson's bay in 1671-72 is the most interesting report yet of record in the Department regarding that northern region.

Of course Mr. Low's expeditions through that wild lone land may be put on a par with Stanley's, but, excepting his descent of the Rupert river with Mr. Macoun, the field of

his operations lies far to the north and east of the territory above described.

The general impression formed no doubt from the experience of surveyors and explorers in this Province was that all that northern region was a cold rocky waste and certainly any one who would visit the head waters of any of our large rivers flowing into the St. Lawrence from the north would naturally be impressed with the feeling that there was little use in searching for anything worth having excepting perhaps fish, game and minerals, any farther north, and I must confess that this was my own impression until last summer.

On Saint-Jean-Baptiste Day, 24 June last (1894), the Reverend Father Gueguin said mass in my tent at the foot of Lake Dumoine.

That reverend gentleman has been missionary among the Upper Ottawa and Hudson's Bay slope Indians for nearly thirty years.

After mass as we were descending the Dumoine river in company with Mr. L. A. Christopherson, Father Gueguin, relating some of his experiences among the Indians, told me of having seen some good land and large timber in the neighborhood of Lake Waswanipi, and strongly advised me to try and explore that country.

Mr. Christopherson, guardian of the Hudson's Bay Company's post at Grand Lake Victoria for the last twenty years, was of a different opinion.

He said that he did not think there was anything worth having beyond the height of land. To use his own words: "The interior Indians who visited his post could not get an axe-handle there."

However I felt a natural inclination to visit the country and having reported to you in that sense, I was pleased when

you decided to honor me with instructions for the same; although I must confess that my most sanguine hopes were far short of the ultimate result.

There is no doubt that instead of a barren mountainous region, there exists a fertile slope gently falling towards James Bay.

Of course, there are barren wastes of burnt country among the highlands of the Mekiskan and along the watershed between there and the Waswanipi valley; and these elevated archæan swells slightly increase in height north-eastward to the source of the Gatineau, but from there, there seems to be a slight depression eastward, for, according to Richardson, Lake Abatagomaw, the source of the Nottaway or Waswanipi river is only 1206 feet above sea level. North-east of Lake Mistassini the dividing range rises more abruptly, for it appears from explorations made at the head of the Rivière aux Outardes, that the Otish Mountains rise to an elevation of 2700 feet above sea level.

I simply mention this to show that there is no insurmountable barrier between the region I speak of and the settled portions of the Province of Quebec.

Dana says on page 358 of his text book of Geology, that: "There is some reason for the opinion that the whole "northern portion of this continent was less elevated than "now, and also that the depression was greatest to the north "since the sea border Champlain formations, on both the "the Atlantic and Pacific sides, are above the present sea "level and at higher elevations to the north or near the "northern boundary of the United States than to the south; "and that on the borders of Lake Champlain 393 feet above "its level, marine shells and the remains of a whale have "been found." He also says that: "In the Arctic regions "similar deposits full of shells are common at different elevations from 600 to 1,000 feet above sea level."

From this the conclusion may be drawn that during the quaternary age the fertile clayey plains of the Hudson's Bay slope were submerged beneath the ocean waters, while immense glaciers covered the archæan swells above described; and the Upper Ottawa waters may have flowed towards Hudson's bay. A cut of 50 feet would suffice at the present day to divert the water of the Ottawa from Grand Lake Victoria into James bay.

Mr. McOuat, in his report of the geological survey of 1873, says: that the mean elevation of the clay plain between Lake Temiscamingue and Lake Abittibi is 900 feet above sea level. This is what I found the general level of the clayey plains around Lake Shobokoma, the level of the lake being 850 feet.

Mr. McOuat further states that Lake Abittibi is surrounded on all sides by level clay land, and the same level clay land extends to the shores of Hudson's bay.

Father Albanel says that on descending Rupert river after passing some rough rapids and portages, he came to a good agricultural country.

The country I explored is about midway between the Abittibi and the Rupert, and Lake Waswanipi is in about the centre of this hitherto unknown territory of 50,000 square miles.

From the highest hills in the neighborhood of the Waswanipi post, no mountains can be seen looking north-east or west. The blue summits of some swells at the south west end of the lake and the head of Mount Wabigoniga and another neighboring hill to the south can alone be seen; in every other direction the country is level or gently undulating.

In the valleys of the Mekiskan and Waswanipi, I have noticed at different places quartz veins that resemble the

auriferous veins of the Chaudière region. Perhaps a further exploration may result in the discovery of gold in that wild lone land.

Climate.—Notwithstanding the different reports to the contrary, there is every reason to believe that the climate of that region can compare favorably with the country along the St. Lawrence between Quebec and Montreal.

Father Albanel says that on the 15th of June, along the Rupert river, he saw wild roses blooming as lovely and smelling as sweetly as any around Quebec.

He must have then been about sixty miles farther north than the farthest point reached by me.

At Waswanipi post, latitude: 49° 39' 55'', I saw on the 20th of September the potato tops as green as in midsummer, while on the Shoshoquon, 120 miles further south, we had very severe frosts in August.

Of course, near the height of land, it would naturally be colder and more subject to early frosts; and in the neighborhood of Hudson's bay, the low temperature of that immense body of water must have a cooling effect on the climate, but at a certain distance from these extremes I believe that a mild, genial climate favors the greater part of the land.

The isothermal lines laid down on the charts should not be taken as evidence for the climate of that region, for these were necessarily taken from the records at the posts on the borders of Hudson's bay and the summit post at Lake Abittibi which cannot be a fair average for the mean temperature of the country.

The most northern point reached by me is still a little south of the parallel of the city of Winnipeg.

The northern boundary of the Province of Manitoba is

several miles north of the mouth of East Main river, and the centre of the Province is about on the same parallel of latitude as the southern part of James bay. Of course we know that according as we go west in equal altitudes the climate is warmer, but the great difference of level between the Hudson's bay slope and Manitoba and the North-West Territory is sufficient to counteract the difference of longitude.

The level of Lake Waswanipi is only 680 feet and it being situated in the centre of that northern plain, the elevation at that summit being 1,000 feet and James bay zero, a mean between the two would give only 509 feet, while the elevation of the city of Winnipeg is 733, Regina 1861 and Calgary 3,397 feet above sea level.

I believe that, as regards climate, the region above mentioned can compare favorably with Manitoba and the North-West and besides there is an abundance of water, with numerous falls for motive power, and unlimited quantities of timber and stone for railway construction, etc.

By inquiring among the Indians of the Mekiskan and Waswanipi valleys, I find that the depth of snow there is about the same as in the Upper Ottawa valley: about three feet on an average.

Access—From what has been said, there is certainly no obstacle to the building of a railway from any part of the Province into the heart of this country, and canals can also be easily made between the St. Lawrence and Hudson's bay waters.

There cannot be much confidence placed in the scheme of a railway to Hudson's bay in view of making it an ocean highway to Great Britain.

The most reliable evidence goes to prove that the navigation of Hudson's straits cannot be depended on for more

than six weeks or two months at the most, and even during that short season it is pronounced dangerous and difficult.

In conclusion, I take the liberty to suggest that no time should be lost in obtaining a fuller knowledge of the remainder of that country and of the most advantageous routes for connecting it with the railway system of this Province.

Nature has destined that the wealth and resources of that vast region should be tributary to Quebec, and it is our duty to leave no stone unturned to secure it. (1)

(1) For further details of the country described in this report, the reader is referred to the large plan made on a scale of one mile to an inch, of record in the Department of Crown Lands.

HENRY O'SULLIVAN, I. S. (1895).

ABITTIBI REGION

The Valley of the Harricanaw river

I have endeavoured to show, approximately on the accompanying map, the location of the tract of lands explored in lines "shaded yellow", which I consider would give 3 townships of...6 miles square on the west side and 6 townships same size on the east side of the Harricanaw river; the latter to be 18 miles fronting on the river by 12 miles deep, that is to say in all a block of land 18 miles square, which would give an area of 207,360 acres.

I have also done my best in a rough way to show, on the map, the principal lakes and rivers not already shown, as well as the proposed line of the Transcontinental Railway which is so soon to serve this great northern country, so that it may readily be seen how advantageously situated the territory just examined is for colonization.

Harricanaw river.—I may say that in no part of northern Quebec which is rich in extensive areas of agricultural lands and I have seen a good deal of it at one time and another, have I met with anything to surpass in excellence the quality of the land in that portion of the valley of Harricanaw, which I have travelled or a more favourable field for settlement. The Harricanaw, is a large river and takes its rise near the height of land flowing through a series of beautiful lakes large and small, draining a very large territory on its way to James bay. The Harricanaw river without improvement is navigable for large steamers from the head of Long lake down to the railway crossing, a distance of about 50 miles.

Of the many tributaries to the Harricanaw met with the most important is the Peter Brown river which empties into the former, about 5 miles south of the railway crossing and one branch of which is crossed by the G. T. P. Railway line about 8 miles east of First Rapid.

This river is navigable for small steamers, for a distance of, I should say, 8 miles from the mouth. The forks are about $1\frac{1}{2}$ mile further up.

The banks of the Harricanaw are generally low, but all danger of its overflowing in spring freshets could be removed by lowering a rocky barrier, which obstructs the channel for half its width at the head of First Rapid three or four feet.

The country is fairly level and is timbered with mixed bush : spruce, poplar, balsam, white birch and dry tamarac.

The spruce is of a good size and the poplar is of the very finest quality, long, straight and clear, and often running as high as 24 inches on the stump, all of which would be ample to serve the requirements of the settler for building, fencing and fuel.

The soil throughout is a rich clay loam with clay sub-soil; a few ridges are to be found here, and there, where the soil is somewhat lighter, but it is all first class everywhere.

There is a very small percentage of swamp lands which are soft to a depth of about three feet, with hard bottom, all of which could be easily drained.

In fact, there is not an acre of land within the block I have shown on the map that cannot be used with profit for some agricultural purpose.

The scenery in this northern country is charming; the lakes and rivers teem with fish and game of all sorts is plentiful, perhaps none more so than the mighty moose.

The land is easy to clear; this is particularly the case with that furthest from the river as there the bush becomes lighter.

The fact of the matter is, those lands only require to be cleared of the timber which would be at once sufficiently

valuable to pay the labor of cutting and clearing, to be equal to the wheat-lands of the North-West.

The fertility of the district is beyond dispute.

The climate is as mild as that of Montreal. With the great Transcontinental railway in operation, the settler would have easy access to those lands. And with such a network of navigable lakes and rivers only awaiting his coming to be turned into highways of commerce and communication, northern Quebec certainly offers agricultural inducements second to none in the Dominion of Canada.

JOHN THOMPSON, Forest Ranger (1906).

UPPER OTTAWA REGION

Report on an exploration of the timber-limits in Block A.

This berth (No 6) is very favourably situated, but there are very few pine; some old and young scrubby pine may be met with, but not in sufficient quantity to be estimated; the west branch and the main Kinojeviskatik river very nearly form the east boundary of the berth; the land is undulating and some good clay loam flats exist; the low ridges are generally covered with small sized white birch and poplar.

I had no time to follow the main river Kinojeviskatik, but a full report is likely given by Mr. Bignell who made the survey, I believe, a few years ago.

The survey of the base line between ranges 4 and 5 was run through to the Kinojeviskatik river, a total distance of 27 miles 53 chains and 04 lks., from the provincial boundary line between the Provinces of Quebec and Ontario, passing through an undulating country covered throughout with green bush composed of spruce, balsam, white birch and poplar of medium sized growth; the soil is good clay loam throughout and well adapted for settlement.

The system of timber berths was continued, such as already licensed to Moore Bros, that is, at every 4 miles 77 chains and 77 lks. the corners of the adjacent berths were marked and the base line run from each corner on chords of the parallel of latitude which I ascertained by altitudes of the sun to be approximatively, 48 degrees 08 min. N. The line was run throughout with a transit and well cut out and blazed; good squared posts marked at each mile were planted; at the termination of the base line at the Kinojeviskatik river, I planted a stone post about 30 inches long, placing broken glass underneath and erected a squared post of cedar six inches square and marked XXVII M—53

chains and 4 lks. from the provincial boundary line on the west side; G. C. Rainboth, P. L. S., Feb. 15th, 1897 and R. IV A. on the south side and R. V. Bk. A. on the north side. The survey of the east shore of Opas-atika lake was made from the narrows near the projected base line between ranges 3 and 4 northwards to its intersection with the base line and connected with the south-east corner of berth No 2 R. V. and thence extended from this base line north between berths Nos 2 and 3, 507 chains 51 lks. to a creek running westerly into Island lake and its outlet, to a falls on the latter, near the northern boundary of the sixth range. The outlet of the Island lake runs north to Abittibi lake and is the stream which is followed by the Hudson's bay co., connecting the Ottawa district with the Hudson's bay posts to Moose Factory on James bay.

Along the main route of travel this country is very picturesque, diversified by rivers, and lakes covered with islands of every imaginable size and shape, different indeed from the lower part of the Ottawa river running through its rugged Laurentian valley, as here the rocks are of a different series, the Huronian; specimens of which I have taken from several localities and which will be marked on the plan. Many of them show specks of sulphites of copper, nickel and iron. A special examination of this country at a proper season would probably discover minerals of value. The country is generally undulating with isolated hills of a peculiar dome shape, some of them rising to a height of several hundreds of feet above the surrounding country; the forest growth is composed of spruce, tamarac, white birch, poplar, pitch-pine, balsam, white pine and cedar, the age of which, as ascertained by counting the rings of growth on several trees, is about 150 years and it has succeeded to the old pine forest that covered this country before the forest fires of a century and a half ago swept nearly the whole extent of the territory. In many places the charred moss-

covered trunks are still found, where the present growth of timber has attained two feet in diameter on the stump.

The lakes are teeming with fish: pike, pickerel and white fish being the principal. Trout are found in some lakes near the boundary line on the Blanche waters, but are very rare. Moose and reindeer or caribou are plentiful. A few tracks of the red deer ("*cervus virginianus*") were seen; the fur-bearing animals are the marten, mink, fisher, otter, muskrat, lynx and beaver. The latter are nearly extinct, but the wise enactment of the present game laws if properly enforced will have the effect of again increasing the families and stocking the many ponds that are now untenanted. I would suggest that this be impressed upon the fur-traders by a close inspection of their stocks of furs, for, as long as the trader will buy the skins from the Indians, so long will the Indian hunter hunt and trap the beaver; the animal is so easily tracked and when found is so easily trapped.

Rabbits or hares abound and are the mainstay or support of the Indian families that hunt or exist in this country. They are to the northern Indian what the reindeer is to the Laplander, food and clothing; out of the skins they make the rabbit skin blanket with which they clothe the little ones and protect themselves from the rigor of the northern winter. In this territory of nearly 30 miles square, there are only about 6 families of Indians, all but one family belonging to the Abittibi band, this one being from Tamagami river in Ontario; and are of the usual style, happy and contented when their larder is filled, but improvident as to filling it.

Taking the country in all its extent, it will be some day a fine agricultural country, as the soil can produce any kind of cereals grown in the northern temperate zone. I have eaten as fine potatoes grown on the height of land portage as ever I saw anywhere, and the Roman Catholic missionary who yearly visits the Abittibi post of the Hudson's bay

company tells me they grow there to maturity. All kinds of vegetables grow there that are grown in the Temiscamingue district. As for the merchantable timber I regret to say that our hopes of finding extensive bodies of pine have not been realized; however, spruce and tamarac are plentiful and will be the timber of the future as in the older limits the pine is being exhausted very rapidly and it is only a question of a few years until spruce and tamarac will constitute the exportable timber from the Ottawa limits. I kept a minimum record of the temperature for the months of December, January and February: the minimum thermometer readings were for December—plus 4.8 Fahr.; for January, plus 5-7 Fahr.; February 1st to 16th.—0.75 Although the minimum readings are low we had two or three soft spells when the thermometer went above freezing point. Altogether it has been a very fine winter with about three feet of snow. I completed the survey on February the 15th, starting down on the 16th by the Mattawa bay or Crooked lake to Messrs. Klocks' shanties and I must express my recognition of their kindness in facilitating our transport from the shanties to the head of the railway at Keepewa station on the T. C. Railway where we arrived on February 26th, arriving home on the 28th.

G. C. RAINBOTH, P. L. S. (1897).

**Report on the survey of a portion of the line dividing ranges
4 and 5, Block A. of the Upper Ottawa Agency**

The greater portion of the line runs through a low, damp region, timbered with black and white spruce, fir, white birch, poplar, banksian pine, tamarac, soft maple, cedar, mountain ash, ash and white pine. The land is level with the exception of a few rocky hills and the soil is of very inferior quality.

A. BLOVIN, L. P. S. (1907).

**Report on an exploration and reconnaissance survey, on the
Bell river, Hudson's bay slope.**

Soil.—The soil along the Bell river is exclusively clay. The only places where rock exposures are seen are at the rapids and falls, and on points projecting into the river, where it widens out.

At some distance from the river, extensive muskegs are to be met with, unfit for farming land, and the country being so flat, drainage conditions are next to impossible.

The banks of the river, in a good many places, are wide mud flats, with a narrow channel in the centre, making the canoe route very difficult to follow. Although the channels are narrow, they are generally very deep.

The soil would be good for hay lands in a dry season, but much too wet to grow potatoes and cereals.

The climate also being rather severe, it is a question whether crops could be successfully raised, until a sufficient area were cleared to prevent early frosts.

Potatoes, that were planted at the Transcontinental railway "cache", on Lake Obaska, were frozen in the month of July, by as heavy a frost as takes place in the Gaspé Peninsula, about the end of September.

Probably oats of the hardy Russian variety would grow, but I do not think that they would ripen.

Wheat would, most certainly, not ripen.

Water powers.—The Bell river offers some good water-powers. The most important of these being the Kiask, just below the mouth of the Kiask river. It has a fall of nearly fifty feet, and at extreme low water, I am of the opinion, that 8,000 H. P. would be a conservative estimate as to its capacity.

DAVID W. MILL, P. L. S. (1905).

The boundary line between the Provinces of Quebec Ontario

The undersigned, Thaddeus J. Patten, Ontario Land Surveyor, for the Province of Ontario, and François Charles Laberge, Provincial Land Surveyor for the Province of Quebec, joint commissioners acting under instructions from the Governments of the Provinces of Ontario and Quebec, respectively, have the honor to report as follows :

The appointment of T. J. Patten, as commissioner for Ontario, is dated in the month of July, 1905, and the appointment of F. C. Laberge, as commissioner for Quebec, is also dated in the month of July, 1905, and that instructions received from Ontario and Quebec are dated the 27th day of July, 1905.

These instructions were for the special object of determining and tracing a part of the boundary line between the two Provinces, from a point known as the 42nd mile northward from the initial point of that part of the boundary line from the head of Lake Temiscamingue, due north astronomically to James bay ; the said 42 miles of said line having been determined and traced in 1874, by W.W. O'Dwyer, P. L. S., representing the Province of Quebec, and J. L. P. O'Hanley, P. L. S., representing the Province of Ontario.

According to the act passed the 12th of August 1889, by the Parliament of the United Kingdom of Great Britain and Ireland, to define the boundaries of the Province of Ontario, 52 and 53 Victoria, Chap. 28, a line running due north from the head of Lake Temiscamingue to James bay is one of the boundaries, and it was this said boundary line, 42 miles of which were determined in 1874, as aforesaid, and from the said 42nd mile northward that was to be determined according to the instructions received by each commissioner.

The documents that were furnished were the following :

1. A plan of the boundary line between the Provinces

of Ontario and Quebec, prepared by W.W. O'Dwyer and J. L. P. O'Hanley, Boundary Commissioners, dated Ottawa, December 1874 ;

2. A plan of a portion of a route from the River Ottawa to Hudson's Bay, signed by Lindsay Russell, and dated Ottawa, the 16th of March 1868 ;

3. A copy of part of a plan of base line by T.P. Speight, O.L.S., in 1900 ;

4. Traverse of part of Upper lake Abittibi, by T.P. Speight, O.L.S., dated Toronto, November, 17th 1900.

After having received the instructions for their respective departments, the two commissioners met in Toronto, on the first day of August 1905, to examine their respective documents and to decide all the particulars of the expedition. The expedition assembled at New Liskeard, Ontario, on the 6th day of August following, and then crossed, on the 7th to North Temiscamingue, where the hiring of men and the final arrangements for the survey were completed.

On the 11th of August, the party left North Temiscamingue, by canoes up to Quinze river, but the supplies were carted 15 miles over the road to Klock's farm, situated on Quinze lake. From Klock's, everything was transported by the party in canoes, by the Abittibi route, to Island lake, and from thence up a river into Labyrinth lake, arriving on Thursday, the 17th day, of August, at the southern end of said Labyrinth lake, near the prolongation of the boundary line as traced and noted by the two commissioners in 1874, and on the same day proceeded to the monuments at the height of land.

The boundary line, as prolonged by O'Dwyer and O'Hanley, to Labyrinth lake, was easily detected. The opening made in the forest in 1874 being plainly visible, was followed easily to the height of land, where the two stone

monuments shown on the maps provided were found, and to the 42nd mile boundary stone planted in 1874, where the work was to begin.

On the night of the 17th of August, several independent successful astronomical observations were made to determine the direction of the true meridian, and on Friday, the 18th of August, a start was made from the said 42nd line stone monument, north astronomically, to determine the boundary line according to instructions.

For plainly marking and permanently designating the said boundary line, it was determined on the ground by an opening through the forest of at least 6 feet in width, and the standing trees nearest to the line were blazed on the north and south sides, and also on the side facing the line. At every mile an iron post, made of tubing, 3 feet long and $1\frac{7}{8}$ inch in diameter, outside measurement, was, where possible, well driven, and close to the north side of it, was also driven a wooden post, not less than 6 inches in diameter and of the best timber available.

On these posts, were well marked on the south side the number of miles in Roman numerals, reckoned from the initial point of the line at the head of Lake Temiscamingue. On the east side was marked "Que." on the west side "Ont."

At the intersections of the lakes and principal streams, a wooden post was planted marked with the miles in Roman numerals, on the south-side. The plus chainage was marked in Arabic, and "Ont." and "Que." on the respective sides.

Where a mile came in a lake or bay, at the intersection of the nearest shore an iron post was also planted and similarly marked.

In several places, where the clay was very hard, holes were dug about two feet and the posts well planted.

Whenever loose rocks were convenient, substantial

cairns were built around the post; these cairns are indicated in the field notes.

Two bearing trees were marked and noted at every post where it was possible.

The measurement of the line was carefully made with a 66 feet steel tape of standard length, a plumb-bob was used by each chainman. The measurement of each mile was carefully checked with a 100 feet steel tape of standard length and, whenever the measurements differed materially, it was remeasured.

All base lines of triangles were carefully measured twice and a mean taken.

The true meridian was determined from the astronomical observations on Polaris at its eastern elongation. The azimuth of the star was calculated by different methods and a mean taken.

The bearing of the rear picket on the boundary already determined was read at each observation, and the error was seldom more than 20 seconds, and in several instances only a few seconds. This is noted in the records of astronomical observations.

An observation for latitude, by meridian altitude of the sun, was made at $54\frac{1}{2}$ miles. The result corresponded very closely with that deduced from the latitude given for the height of land monuments.

The production of the line was done with a sight and a reversal sight from a transit to a steel picket on a hub. A tack was driven in the hub midway between the two sights. In mountainous country, sights were taken from hill to hill and at times exceeded a mile in length. In such cases, the line was accurately defined in the intervening valleys with a transit.

The boundary line was continued across Lake Abittibi, a total distance of nearly 46 miles to the south bank of the Okikodosek river in the 88th mile. This river empties into the large bay on the north side of Abittibi lake.

Fearing that the cold weather, prevailing at the time, might freeze this bay which is very shallow, operations were discontinued on the 13th day of October, and the following day the return journey, by way of Abittibi, Hudson's Bay Company's post, was begun, following the Abittibi route to to Klock's farm on Quinze lake, and from there to North Temiscamingue, and New Liskeard, which latter place was reached on the 23rd of October.

The party, while returning, was delayed by wind and bad weather for more than a day. On the 23rd of October, the party was paid off, and the members left for their respective homes the following day.

During the course of the survey, sketches of lakes were made and, in some instances, canoe surveys with magnetic directions or micrometer surveys, also with magnetic directions of the islands or shores of rivers and lakes situated on the immediate vicinity of the boundary line, were also made.

The line as traced on the ground is very plainly visible and, in some places, a sky line was cut through the woods to allow of longer sights to be taken.

At station 75 miles plus 47.50 chains, one of the prominent points in Lake Abittibi, was merely touched by the line, and for that reason it was named Boundary Point on the plan.

The timber from the height of land at Labyrinth lake is principally jack pine up to 12 inches in diameter, tall and clean, and would make good lumber for some purposes. With it there in some white birch and balsam of good size.

Around Labyrinth lake, there is some large white pine,

scattered. There are also white spruce, balsam, cedar and white birch.

From Labyrinth lake to Abittibi lake, the timber is the same, but includes large poplar and balm of Gilead, and in the swamps large black spruce and dry tamarac. Cedar is found around the lakes and streams, much of it is unsound at the butt. Black pine is found to 24 inches in diameter and is also clean tall timber. Some large white pines, about 24 inches in diameter, scattered, were found on the 53rd, 55th and 63rd miles. Near the south shore of Abittibi lake there are also a few white and red pines.

In some low spots, black ash is found. To the east of the 52nd mile there is a fine tract of black and white spruce.

On the large island called Kenosha Obyowa, in the Abittibi lake, the timber is much smaller. The reason of this, the Indians say, is that about 35 years ago, a severe rain storm in the winter deposited so much ice on the trees that the boughs were all destroyed.

None of the country traversed has been burned for a great many years.

The most important character of the soil is that it is constituted, for the greater part, of clay which is well drained and, therefore, after the forest has been cut, good farming land will be developed in the valleys.

From the 42nd mile to the 58th mile, the country is hilly and the rock crops out at every hill top in the form of ridges and bluffs of a very broken character.

From the 58th to the 68th mile, although rocky on the hills, the country is less broken and the hills have more gentle slopes. From the 68th mile to Abittibi lake, the line descends into a valley principally of good clay land.

From the north shore of Abittibi lake to the end of the line, the country is principally low land covered with black spruce, with higher land adjoining the streams.

The general direction of the hills is east and west, and they are separated by valleys of from one half mile to one mile in width and these valleys are connected, at intervals, by hollows, gulleys or creeks, thus rendering them easily accessible from one to the other.

The waters flowing in the streams and accumulated in the lakes are coloured by sediments, the more as Lake Abittibi is approached.

In Lake Labyrinth, the water is coloured slightly whitish, and only in the Trout lake clear water was found.

The other waters are coloured by the clay in suspension.

The bottom of Lake Abittibi is all clay and, on account of its shallowness, the water is always muddy.

The rock that constitutes the hills is mostly a fine grained greenish rock, sometimes passing into diorite.

These rocks belong to the Huronian formation and are very broken.

In a few places quartz veins were visible, but no mineral of importance was noticed in them.

The Acipimocasi river, which was crossed on the 61st mile, is a fine stream. It forms a portion of the canoe route from Blanche river to Abittibi lake by way of Metawagogie or Upper lake, into which it empties. The valley of this river contains fine farming land.

Nothing was crossed or seen . . . which might form the Abittibi river which is dotted on the maps.

Labyrinth lake, Trout lake and the smaller lakes abound with fish, principally pike, pickerel, and bass. In

Lake Abittibi, the same fish are found, also lake trout and white fish.

Moose and red deer were seen, also bear tracks. There is also an abundance of smaller game.

T. J. PATTEN,

F. C. LABERGE, P. L. S. (1906).

THE BOUNDARY LINE

Preliminary report or survey of inter-provincial boundary line between Ontario and Quebec

I was agreeably surprised to see so much good land all along the line and the timber much better than I had expected. Where we commenced was at the crossing of the river called Okikodosec, at a distance of 87 miles 60 chains as laid down on the plan by Messrs. Laberge and Patten.

The land is of the best quality of alluvium and clay and the timber, though not large, averaging from six to twelve inches and odd trees up to eighteen inches, is long and straight, mostly spruce and aspen poplar, (tremble), The poplar would make beautiful wood for cabinet-makers and for flooring as it is white, straight and sound, and the spruce is of the best quality for pulp wood and building timber or saw logs where large enough.

There is a great quantity of what is generally called jack pine (banksian pine).

I have marked on the tracing the different sorts of timber, *brûlé*, etc., and the quality of the land.

The river Okikodosec, we found to be of great help to us in forwarding our supplies as we crossed it several times, as can be seen on the tracing plan. We were surprised to see this river flowing towards its source fully one third of the time, according as the wind changed from north-west to south-west or south-east, having the appearance of a tidal river.

The climate I found during the time I was there to be just as good as at Quebec; in fact, with the exception of two nights in August, the 13th and 14th, when we had frost which froze the water to ice in our water vessels, but which had no effect near lakes or large rivers we had beautiful

growing and ripening weather all the time, with sufficient rain, up to the 15th September, when we had very heavy frost, the ice being three eighths of an inch thick. Yet this was not felt near the lake or near the wide rivers, as the men who were packing along the Hannah bay river, Harri-canaw on maps, did not notice it, and on the 6th of October when we arrived at the Hudson's bay post at Lake Abittibi, the potatoes and garden flowers were quite green.

I thought in fact that the sun felt hotter than at Valley-field, but since my return, I have been told the summer was an exceptionally hot one all over the country.

Mr. Moberly, the chief engineer, in the section north of Lake Abittibi, gave me samples of wheat, oats and barley he grew at White Fish river, a tributary of the Abittibi, flowing into the lake from the north-east, which I will take to your department when I go to Quebec.

We crossed several lines run by the G. T. P. Railway engineers: which I have shown on the plan, but the one I understood to be finally located is on the 91st mile.

Mr. Moberly gave a glowing account of the land along the lines run north of Lake Abittibi and I have no doubt that as soon as the G. T. P. Ry. is built, all that section will be taken up by colonists and when cleared to a certain extent become a good agricultural country. The greatest drawback is late spring and summer frosts, but when a large extent becomes cleared and cultivated, I have no doubt the climate will improve in that respect as has been the case at Lake St. John and out west.

J. H. O'SULLIVAN, P. L. S. (1905).

**Report on the tracing of the inter-provincial boundary
between Ontario and Quebec**

There have been no fires for a great many years in the country through which we passed.

The most important feature of the soil is that it consists in a great measure of well-drained clay and is consequently very suitable for cultivation, after the timber is removed.

From the 52nd to the 58th mile, the land is hilly; rock outcrops on the top of every rise of the ground in the shape of ridges and the whole has a very broken aspect.

From the 58th to the 68th mile, the land, although rocky on the heights, is not so broken and the slope of the hills is not so steep. From the 68th mile to Lake Abittibi, the line runs through a valley of good clay loam.

From the north shore of Lake Abittibi to the end of the line, the land is generally low and covered with black spruce; the ground rises near the streams.

T. J. PRATTEN & F. C. LABERGE,

Boundary Commissioners.

**The interprovincial boundary line between Ontario
and Quebec**

In accordance with your instructions dated June 14, 1906, to define the portion of the boundary line between the Provinces of Ontario and Quebec from the intersection of the Okikodosek river in the 88th mile to O. L. S. Speight's base line, we proceeded on the 13th of July by way of New-Liskeard, Ontario. After arranging for our supplies and a

full complement of men, a number of the men having been by mutual agreement engaged on Manitoulin island, Lake Huron and the transport of supplies to Klock's farm on Lac des Quinze, we started from Klock's on the 23rd and arrived at Abittibi, Hudson's bay co's post, Saturday, 28th July, at noon. We remained at the post until Tuesday morning 31st, having been windbound on Monday.

On account of an epidemic of measles among the Indians at Abittibi we were unable to procure a guide for the country north of Abittibi lake. However, after proceeding with the work for some time, we engaged for that purpose an Indian named Joe, who lives on Joe lake, west of the 106th mile.

On the evening of the 31st July we arrived at the first intersection of the Okikodosek river, our starting point, and after observing the eastern elongation of Polaris on the same night in order to find the meridian, we proceeded next morning to continue the boundary due north astronomically from the post planted by the commissioners in 1905 at 87 miles and 60 chains on the south bank of the said river to the end of the 10th mile, which is 46 chains and 52 links north of the intersection of the said O. L. S. Speight's base line, and which base line we intersected at a point one chain and ninety-three and one-half links east of the 70 mile post planted by him in 1900 to mark approximately the position of the inter-provincial boundary.

Having completed the boundary to the end of the 104th mile on the 27th of September, we, after a day spent in repairs to our canoes, commenced our return by way of the Woman river, which stream our canoemen on the way north had found to be a fairly good route, and while travelling we made a track survey of it, also of the Okikodosec river. A portage of about six miles connects the headwaters of the two streams.

On Saturday, the 6th of October, we reached Abittibi post, having been delayed nearly a day by a heavy rain-storm. On account of being short of provisions, we did not complete the stadia survey of the lower portion of the Okikodosek river. We remained at Abittibi over Sunday and were obliged to remain in camp there during a severe blizzard which lasted nearly two days. On Wednesday, 10th October, we left Abittibi and reached Klock's farm, Sunday, 14th, at noon, a heavy headwind on the previous day having delayed us considerably. On the evening of the 15th we reached north Temiscamingue village, and on the evening of the 16th arrived at New Liskeard, where we remained until the 20th in paying our men. We might say that, through a delay in receiving our cheques when we arrived at New Liskeard, we were obliged to remain over there on Thanksgiving Day, the 18th of October. On the 20th we left New Liskeard and arrived at our homes a day or two later.

On level ground the bush was cut out three feet on each side of the line, making a total width of six feet. In the rolling and hilly portions a somewhat greater width was cut in order to gain a clear sight of about 40 to 50 chains. The trees nearest the line were blazed on the north and south sides, also on the side facing the line.

At the end of every mile a post of iron tubing, one and seven eighth inch in diameter and three feet long, was driven about two feet in the ground, and close to the north side a wooden post six inches square of the most durable timber convenient was also planted, and whenever stones were convenient a large cairn was built around them. These cairns are shown in the accompanying field notes. On each post was cut on the south side the number of miles, in Roman numerals, counting from the head of Lake Temiscamingue. On the east side was cut "Que." and on the west side "Ont."

With the exception of one or two places where no timber was near, at each mile post, two bearing trees were marked "B. T." The course and distance of said trees from the post are shown in the field notes.

At each intersection of the Hannah bay river a wooden post was planted on the south bank and marked similarly to the mile post. Also at the intersection of Speight's base line an iron post of the above dimensions, also a wooden post, were planted and similarly marked.

The line was produced by alternate sights with reversals of two Troughton & Simms transits, one of 6-inch limb, the other a 5-inch, to a steel pointed picket on a hub. A tack was then driven in the hub at the mean of the two sights.

All observations of azimuth were taken from an elongation of Polaris by both instruments and a mean taken.

Observations for latitude by meridian altitudes of the sun were also made.

Each mile was carefully measured with a 66 feet steel tape of standard length. It was then remeasured with a 100 feet steel tape as a check.

All base lines for determining the width of lakes and rivers were carefully measured twice.

The magnetic variation averaged about ten ; more correctly 9 degrees 50 minutes west of north and was very steady.

The survey lines of the Transcontinental railroad were intersected on the 90th, 91st, 92nd and 94th miles, the line crossing the Okikodosek river frequently to the 98th mile post.

The rock is principally red granite and greenstone. No economic minerals were found. The soil is all good clay, mostly rolling and suitable for agriculture from the begin-

ning of the season's work to the middle of the 101st mile. Here the hills forming the divide between the Okikodosek and Woman rivers begin and continue until the lake on the latter river, in the 107th mile, is reached. This divide is mostly rolling country with sand and boulders on the hills and occasional rock exposures with clay and occasional muskegs in the lower levels. The hills are from 20 to 60 feet high. In the 101st mile a ridge running nearly east and west and about 250 feet high was crossed.

Hannah river.—From the lake mentioned in the 107th mile the country is mostly clay and rises to the 110th mile, where the divide between the Woman and Hannah bay rivers is reached. The divide is the similar to the one just described and extends to about the end of the 118th mile, where the line descends to the valley of the Hannah bay river, called on the map Harricanaw river.

From the 118th to the middle of the 131st mile, the country is all good clay land, mostly level, with an occasional elevation from 20 to 40 feet high. A large percentage of this portion is wet, the water being prevented by the moss from draining off. From the 131st mile to the end, the country is nearly level. The elevations are generally not more than six feet. A large percentage of this is also wet land covered with moss. From about the end of the 137th mile to the end and as far north as could be seen, the country is mostly marshes covered deep with moss, and in places with timber varying from scattered, scrubby spruce to small thickets of the same, about 10 inches in diameter.

The Hannah bay river was crossed in the 130th and 134th miles, and below its confluence with the Woman and Burnt Bush rivers, opposite the 132nd mile, it is about 8 to 10 chains wide.

Woman river—The creek on the Ontario side emptying into the Woman river opposite the 124th mile is used by

the Indians as a canoe route. The mouth of it appeared to be blocked with some logs when we returned.

In the 136th mile a deep stream, about a chain wide, was crossed. This stream, the Indians say, is a canoe route to the west.

The Woman river is about two chains wide at its mouth up to the falls opposite the 126th mile. Canoeing on it in low waters with loads is tedious on account of numerous boulders. Otherwise it makes a good canoe route. The portages are mostly short. On account of the shorter portage at the divide it might be preferred to the Hannah bay river route. The land along it is mostly clay and well timbered. The timber throughout the line consists of black spruce, jack pine, poplar, balm of Gilead, white birch and dry tamarac, varying mostly from 6 to 18 inches. In some localities it attained a greater diameter. The poplar would make beautiful wood for cabinet-makers and flooring, as it is white, straight and sound. In a few places along the larger streams large white spruce occurs. The spruce is of the best quality for pulp-wood and building timber. The jack pine is mostly fine tall timber and free of limbs to near the top. With the exception of along the Hannah Bay river very little balsam was seen. From near the end of the 137th mile, as mentioned above, the timber on account of the muskeg and moss dwindles to scrubby spruce with an occasional small thicket of large spruce. This appears to be the southern limit of the great muskeg.

From about the middle of the 103rd mile to near the lake in the 107th mile, shown in the notes as Lake Billy, also east of this lake and north of it some distance parallel to the line, the country has recently been burnt. Along the Woman river in places an older burnt tract is found.

Lots of pickerel and pike were procured by the party and, in the small brooks, speckled trout. Along the Hannah

bay river the Indians brought in a few of the large speckled trout.

Very few partridges or rabbits were seen. The Indians who hunt there say that on account of the rainstorms last winter the above game, when under the snow at night, perished under the resulting heavy crust.

There is evidence of moose and deer. We were told a great number of them have been killed in the country recently.

From the falls of the Woman river a considerable amount of power could be developed.

The climate we found to be similar to that of similar latitudes in Ontario and Quebec. On the nights of 13th and 14th of August the water froze in our water vessels, but no effect of the frost was seen on the lakes or rivers. We had beautiful ripening weather all the time with sufficient rain. On the night of the 16th September we had a considerable frost. On the 6th of October, when we arrived at the Hudson's bay company's post at Lake Abittibi, the potatoes and garden flowers were quite green.

Mr. Moberly, one of the engineers in charge of the Transcontinental railroad survey, gave us some samples of wheat, oats and barley which he grew at the Whitefish river, a river flowing into the Abittibi lake from the north-east.

There is no doubt that the country, when sufficiently cleared up, will be quite clear from summer frosts.

J. H. SULLIVAN, P. L. S.,
Commissioner for Province of Quebec.

T. J. PATTEN, O. L. S.,
Commissioner for Province of Ontario (1907).

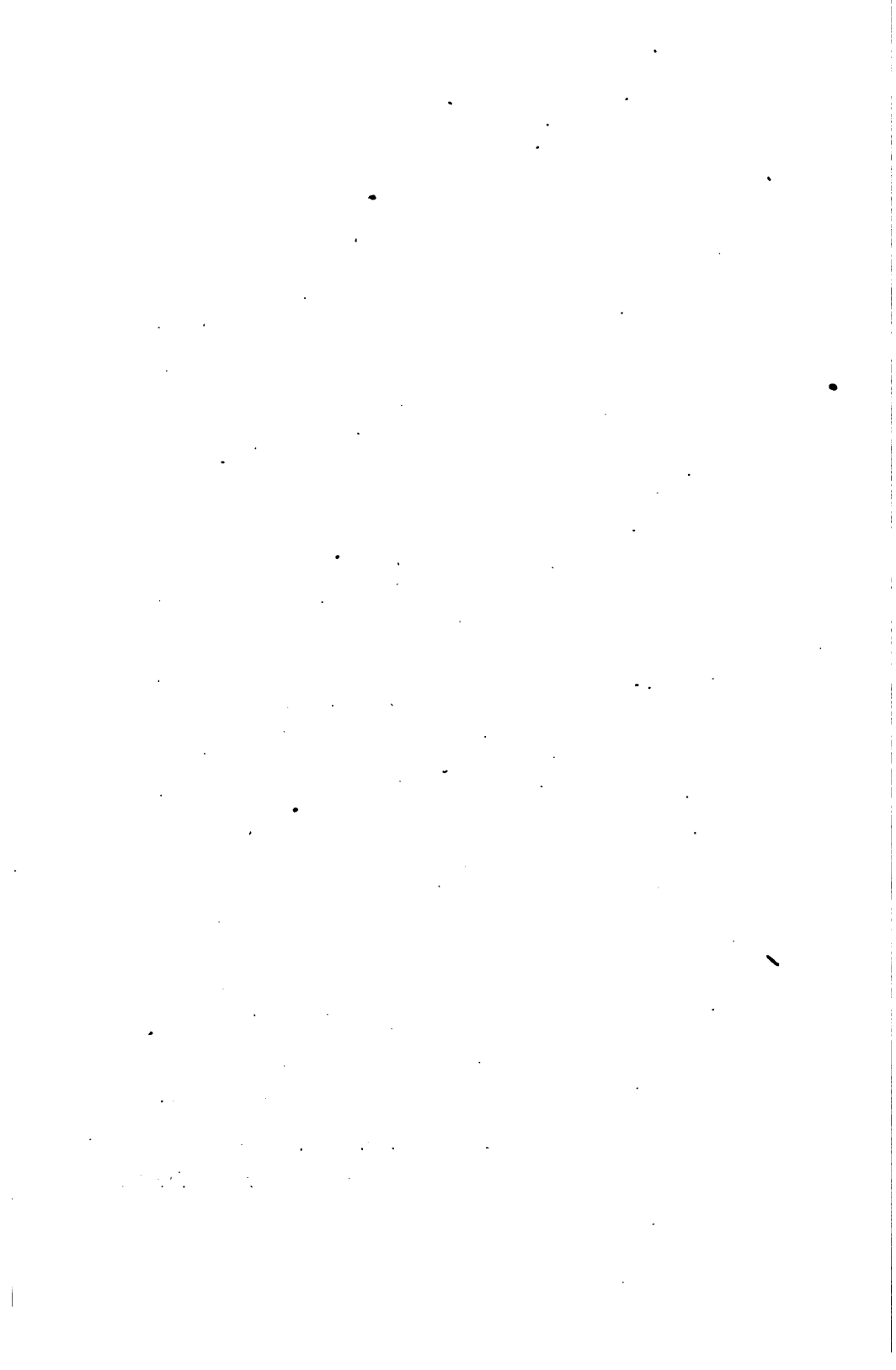


TABLE OF CONTENTS.

	PAGES.
Description of surveyed townships.....	5-102
Exploration of lots in Tellier township by Mr. J. C. Piché, forestry engineer 1907.....	15
Report on samples of soils from Tellier township by Mr. E. T. Shutt, 1907.....	27
Gouin Road.....	77
Trembling Mountain Park.....	98
Boundary Line between the Provinces of Quebec and Ontario...	269-277

EXPLORATIONS OF TERRITORIES.

REGION.

UPPER OTTAWA.—Survey of the tributaries of “Gens de Terre” river—Soil and timber.....	103
do Survey of the Shoshoquon River.—Extent of streams—Soil and timber.....	110
do Survey of the Kapitajevan and Kamichigoma rivers and lakes.—Nature of soil and timber.....	117
do Survey and exploration of a portion of the north-western section of the Upper Ottawa. Timber and hunting territories.....	120
do Description of the country between the Winaweaske river and Great Lake Victoria. Area of the lakes and characteristics of the soil.....	127
do Topographical survey of the lakes, rivers and portages in the Upper Ottawa region.	134
do Preliminary survey in view of the opening of a canal between Great Lake Victoria and east branch of the Dumoine river.....	148

REGIONS.	PAGES.
UPPER OTTAWA. —Region between the Ottawa and Gatineau rivers.—Names of lakes and rivers.....	153
do Exploration of timber limits in Block A....	264
HEIGHT OF LAND. —Report on a survey in the north-western section of the county of Pontiac.....	120
do Region of the Rupert and Marten rivers. Soil and hunting territories.....	183
do Region of Lake Mistassini and of the Rupert and Marten rivers.....	187
JAMES BAY. —Survey and exploration of the south-east shore...	210
do Report of survey from Rupert House to Lake Temiscamingue.....	224
do Exploration of the country watered by the rivers falling into James Bay.....	235
HUDSON'S BAY. — Exploration south of Hudson's Bay. — Climate.....	231
do Exploration of part of Hudson's Bay slope..	233
ABITIBI. —Exploration of the valley of the Harricanaw river....	261
do Exploration of the Bell river.....	268

INDEX

Of rivers and lakes of the Abitibi, James Bay, Hudson's Bay and Upper Ottawa regions mentioned in this volume.

ABITIBI REGION.

Rivers.	PAGES.	Rivers.	PAGES.
Acipimocasi.....	275	Kinojevis.....	126
Bell.....	268	Okikodosec.....	273
Harricanaw.....	261-227	Waswanipi.....	245
LAKES		LAKES	
Abitibi.....	228	Matawagosie.....	229
Agotawikami.....	229	Oposataka.....	229
Labyrinth.....	273	Waswanipi.....	234-259

JAMES BAY AND HUDSON'S BAY.

RIVERS		RIVERS	
Asphicamish.....	226	Missisicabi.....	220
Broad Back.....	225	Nottaway.....	210
Cannon.....	241	Pontiac.....	212
East Main.....	215	Rupert.....	185
Hannah.....	283	Wedding.....	242
Marten.....	199	White fish.....	228
Megiskan.....	245	Woman.....	283
Miskittenau.....	190		
LAKES		LAKES	
Abotagoman.....	256	Obiska.....	238
Macoostigan.....	249	Shabokoma.....	240
Matowikoma.....	238	Simon.....	238
Narrows (of the).....	247	Wequapatoshakamikak.....	236
Nemiskan.....	197	Witetnagomi.....	249

UPPER OTTAWA.

Rivers.	PAGES.	Riverss	PAGES.
Coulonge.....	109	Rabbit.....	163
Desert.....	153	Seize.....	162
Du Moine.....	148	Shebish.....	217
Fox.....	171	Shoshoquon.....	110
Gens de Terre.....	103	Sliding.....	177
Kamichigama.....	109	Tomasine.....	154
Kapitajewan.....	117	Trout.....	164
Moose.....	102	White Goose.....	251
Perch.....	166		

LAKES

LAKES

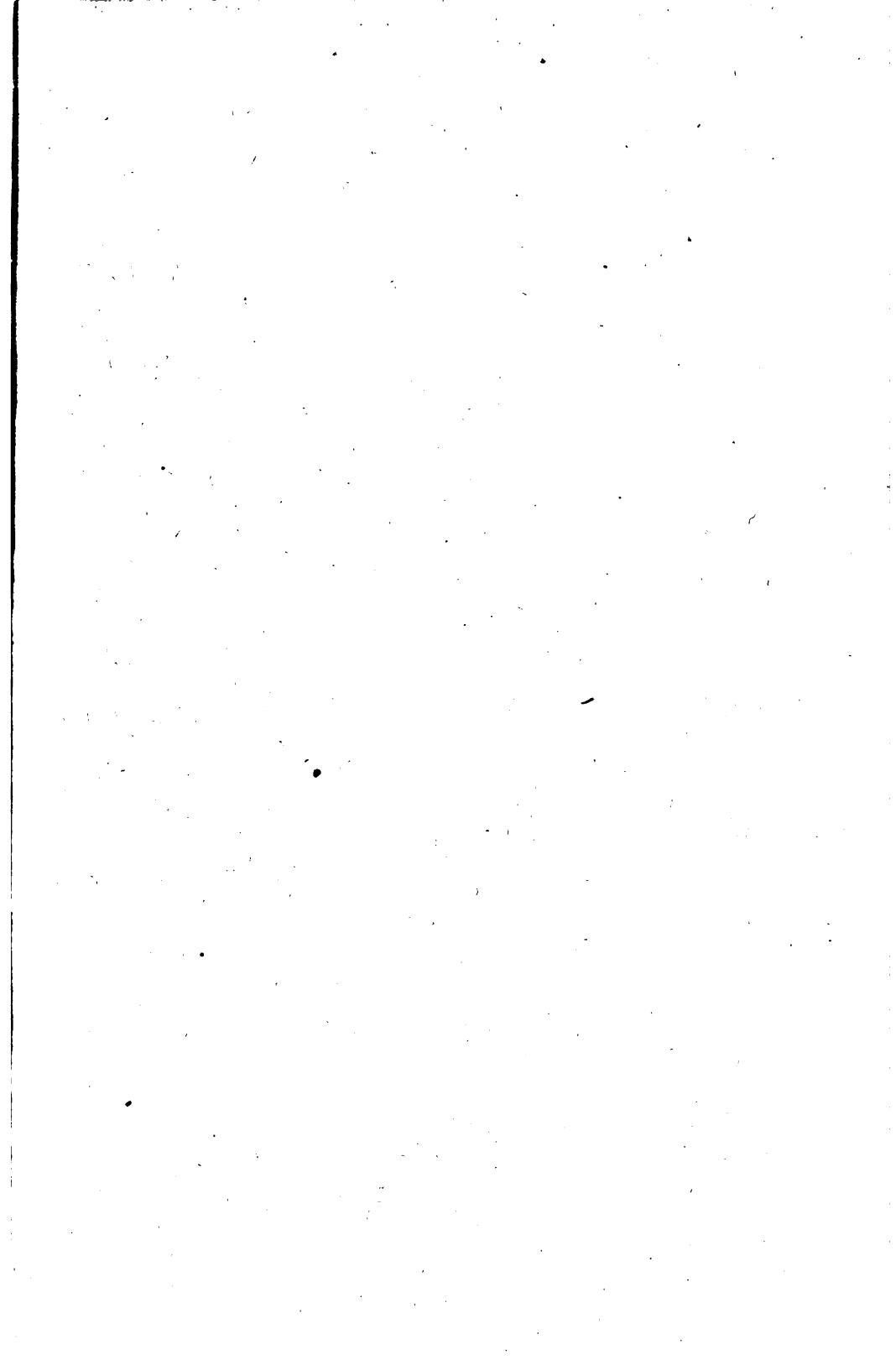
Aconcey.....	119	Kawishte.....	166
Andousegemegama.....	171	Kenocheasanan.....	164
Antostogan.....	156	Matchi-Manitou.....	113
Awasheameka.....	157	Mishomis.....	128
Bark.....	161	Moose.....	103
Barrière.....	174	Moose Horn.....	130
Bay.....	133-149	Muzenah.....	112
Big.....	115	Neinegos.....	113
Birch.....	108	Nemegosis.....	112
Bouchette.....	120	Nichkotea.....	105
Bras coupé.....	160	Opequon.....	177
Burnt.....	165	Petewagama.....	163
Calm.....	175	Pike.....	160
Catfish.....	155	Poigan.....	162
Cawassajewan.....	132	Rapid.....	106-159-172
Crow.....	161	Rock.....	155
Désert.....	154	Round.....	153
Du Mont.....	96	Shoshoquon.....	111
Flambeau.....	156	Squaw.....	97
Island.....	136-160	Tomasine.....	154
Kakabonga.....	167	Trout.....	164
Kamichigama.....	118	Vert.....	115
Kamikwamika.....	176	Victoria (Great Lake).....	131-180
Kamokitchi.....	114	Washkega.....	169
Kanikito.....	106	Winaweaske.....	128
Kapitajewau.....	118	Windfall.....	156
Kawatosee.....	107	Wolf.....	157
Kawee.....	112		

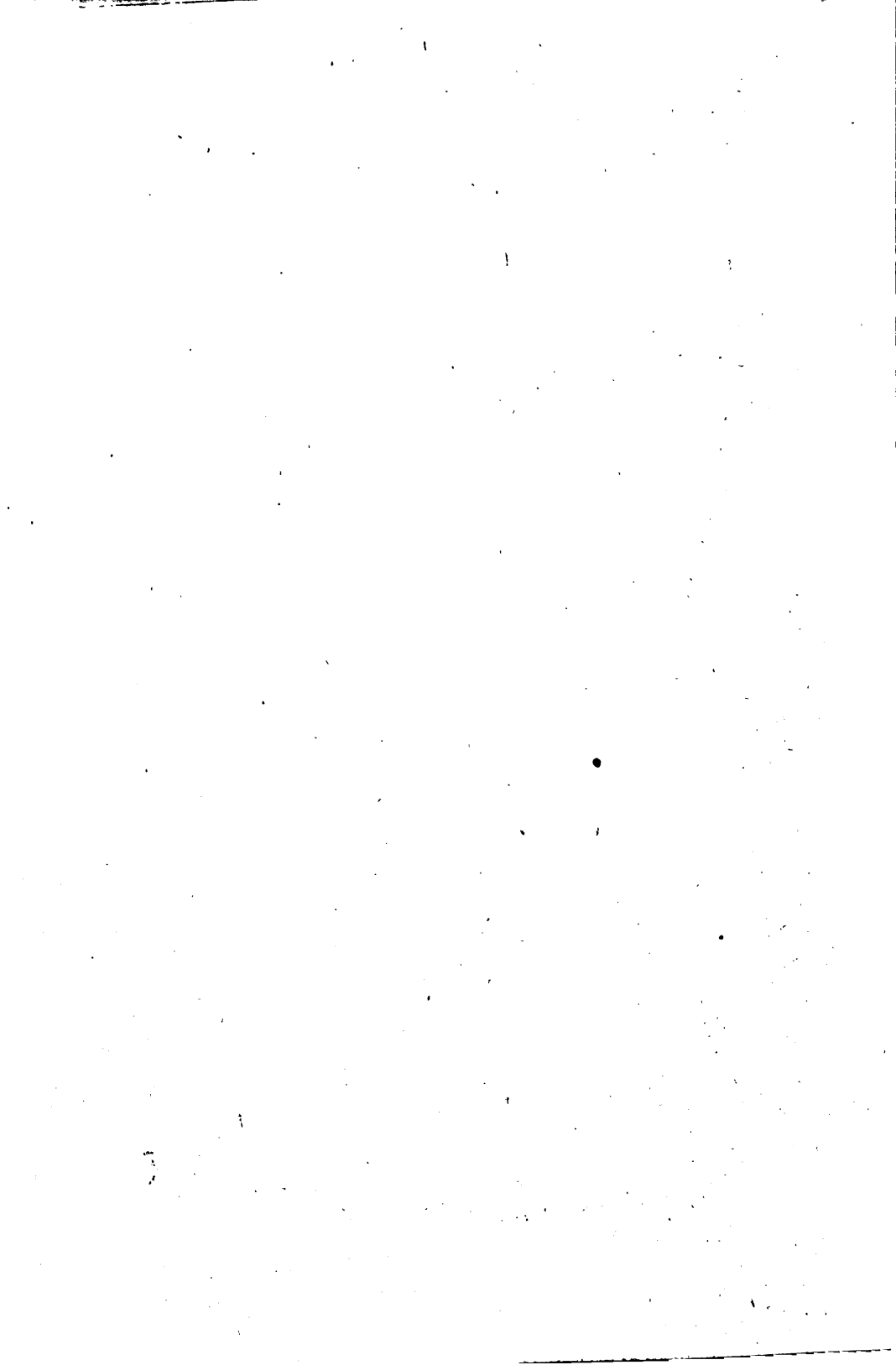
INDEX OF SURVEYED TOWNSHIPS.

Townships.	Counties.	PAGES.
Archambault.....	Montcalm.....	30
Baby.....	Pontiac.....	79
Blake.....	Ottawa.....	38
Bouthilier.....	".....	43
Boyer.....	".....	45
Brassard.....	Berthier.....	6
Campbell.....	Ottawa.....	46
Cartier.....	Joliette.....	17
Carthcart.....	".....	11
Chertsey.....	Montcalm.....	34
Courcelles.....	Berthier.....	5
Fabre.....	Pontiac.....	80
Gagnon.....	Ottawa.....	49
Gauthier.....	Berthier.....	8
Gendreau.....	Pontiac.....	85
Gillies.....	".....	86
Gouin.....	Berthier.....	8
Grandison.....	Terrebonne.....	98
Gravel.....	Ottawa.....	52
Guerin.....	".....	87
Guigues.....	Pontiac.....	91
Hincks.....	Ottawa.....	54
Kensington.....	Ottawa.....	55
Kiamika.....	".....	58
Laverlochère.....	Pontiac.....	92
Lynch.....	Montcalm.....	34
Lytton.....	Ottawa.....	59
Major.....	Ottawa.....	60
Mazenod.....	Pontiac.....	95

 INDEX OF SURVEYED TOWNSHIPS.—(*Continued.*)

Townships.	Counties.	PAGES.
Montigny.....	Ottawa.....	62
Moreau.....	".....	65
Mousseau.....	Montcalm.....	36
Nantel.....	Montcalm.....	36
Nedelec.....	Pontiac.....	95
Pope.....	Ottawa.....	66
Provost.....	Terrebonne.....	6-7
Robertson.....	Ottawa.....	68
Rochon.....	".....	67
Tellier.....	Joliette.....	11-15
Tracy.....	Berthier.....	7
Villeneuve.....	Ottawa.....	68
Wabassee.....	Ottawa.....	71
Wells.....	".....	73
Wurtelee.....	".....	75











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